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8

# Pit and Quarry

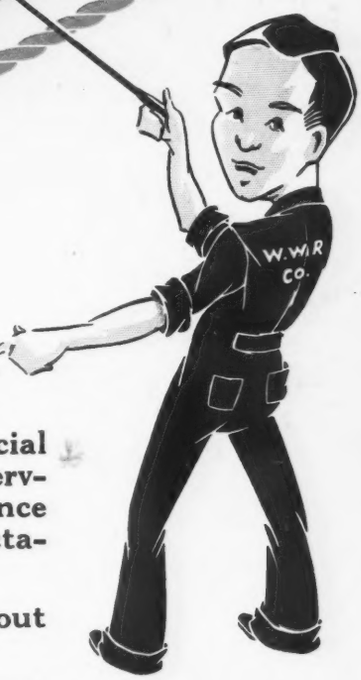
*With which is consolidated*

CEMENT-MILL & QUARRY

**April 6, 1932**

APR 9 1932

*A good pointer on buying wire rope is; "Williamsport"*

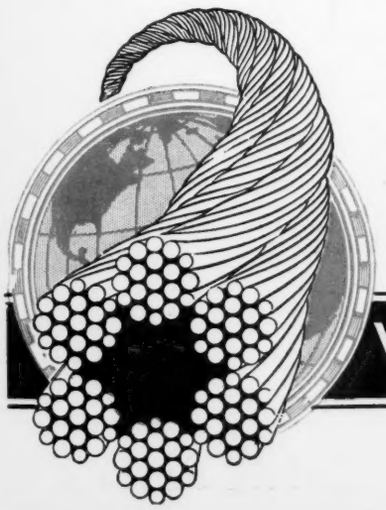



*because*

**Our engineers have perfected special wire ropes for drag line and quarry service that are establishing performance records far beyond our own expectations.**

**Write us today for specific facts about these new ropes.**

**You can hardly afford to do without them. They have reduced operating costs for others; why not for you too?**



**WILLIAMSPORT WIRE ROPE CO.**

*Main Office and Works:*
WILLIAMSPORT
PENNA.

40785

*General Sales Offices:*
122 So. Michigan Ave.
CHICAGO

# Is there a WIRE ROPE *Cure-all*?

There are many types of wire rope and a wide variety of wire rope constructions. These have been developed over a long period of years to satisfy diverse requirements.

In the case of Roebling, many years have been spent in the development and improvement of rope design and production —in searching out the truth regarding wire rope performance —in an organized endeavor to give the rope user more for his rope dollar. As a part of this program, every type and construction of wire rope has been and constantly is being exhaustively studied in laboratory and field to determine its qualities and proper application, and to seek improvements.

Out of this effort has come, for one thing, the conviction that no one type or construction of wire rope is suitable for all purposes—that there is no wire rope "cure-all".

You will find, therefore, that Roebling does not favor any one kind of rope. It endeavors to, and because of its complete line, is free to recommend exactly the rope that most economically will meet the user's needs.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.
*Wire · Wire Rope · Copper & Insulated Wires & Cables · Welding Wire · Flat Wire · Wire Cloth & Wire Netting*
Branches in Principal Cities Export Dept.—New York, N. Y.

### *A plain statement about Wire Rope Economy*

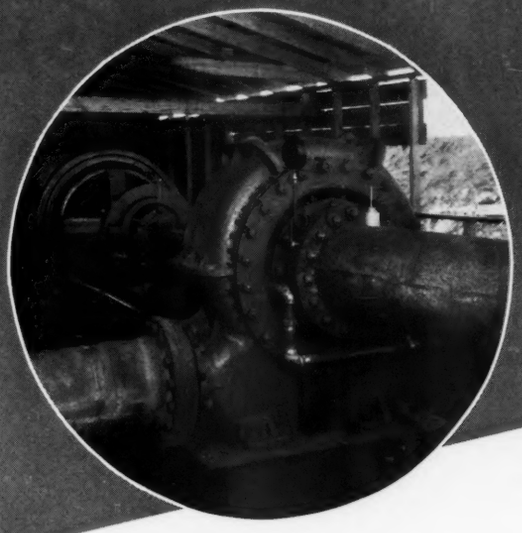
Roebling does not indulge in nor encourage sweeping claims of superior wire rope economy. Such claims, if generally made, would merely confuse the rope user. ¶ For the guidance of rope buyers, however, Roebling does assert that when gauged by the work performed, NO wire rope, regardless of make or construction, will show lower general average operating costs than Roebling.

### *Wire Rope for all purposes*

Roebling makes wire rope of a great variety of types and constructions, and therefore can supply a wire rope exactly suited to each particular requirement. ¶ The great stamina of all Roebling Ropes is primarily due to the quality of Roebling Wire. This Acid Steel Wire is renowned for its fatigue and wearing qualities. No better rope wire is produced. ¶ "BLUE CENTER" STEEL is the highest grade and is generally recommended for severe duty.

## JOHN A. ROEBLING'S SONS COMPANY

2205
.68
.24
April-Sept
1932



# Letter Explains Why They Re-ordered

**This letter written at our request by the George C. Bolz Dredging Company describes the performance of their Hydroseal Pump, on a river dredging job at St. Louis, to a prospective purchaser of a pump. It also explains why this concern has just purchased a second Hydroseal Pump to replace a pump of another make. If you have felt skeptical of our claims, we believe this letter will remove all doubt. We seldom find a sand, rock or sludge pumping job where the Hydroseal Pump could not pump ½ more material with no increase in power or save 1/3 in power with no decrease in production. If you question whether such economies could be made in your plant, write us describing your conditions. Ask for our new Bulletin 132, for it gives more information about the Bolz installation and a description of the pump. The Allen Sherman Hoff Company, 215 S. 15th St., Philadelphia. Offices in Twenty Cities.**

**HYDRO SEAL**

CHESTNUT 8873

GEO. C. BOLZ DREDGING CO
HYDRAULIC DREDGING AND CONTRACTING
412 NORTH LEVEE
ST. LOUIS, MO.

December 17, 1931

[redacted]

Dear Sir:

We have a letter from Mr. F. B. Allen of the Allen-Sherman-Hoff Co. in which he requests that we give you any information available concerning our experience with their new Hydroseal dredge pump.

We purchased one of their pumps about the first of October and in about 45 days of operation have handled some hundred and twenty five thousand yards of material through it. We were rather skeptical at first about deviating from the conventional type of dredge pump in order to give the Hydroseal a trial but since installing same find that it not only far exceeds our expectations but also the claims made for it by the manufacturers.

We have the Hydroseal acting as a booster in our pipe line with better than 4,000 feet of horizontal line and about 26 feet of vertical lift. The vertical lift is on the far end of the line and we really feel that the Hydroseal is doing the work of two ordinary boosters. We find also that the pump is economical to operate as the water seal principle cuts down friction to a minimum and saves a large part of the wear on the impeller and side plates ordinarily encountered in handling highly abrasive materials. We are doing the work stated above with one 500 HP motor and the pump shows very little signs of wear considering the amount of material handled.

We consider the pump exceptionally well constructed of the best of materials and have no hesitancy in recommending it for handling the most abrasive material.

Yours very truly,

GEO. C. BOLZ DREDGING CO.

By J. M. Himmelberger

THE ALLEN-SHERMAN-HOFF CO.
*Hydroseal and other products*
215 South Fifteenth Street
PHILADELPHIA

December 16, 1931.

Mr. George C. Bolz,
c/o George C. Bolz Dredging Co.,
412 North Levee Street,
St. Louis, Missouri.

Dear Sir:

I am wondering if you would be so kind as to write [redacted] in relation to the Hydroseal Dredge Pump which you have been operating. This gentleman is very interested in the purchase of one of our pumps, but is of course not particularly familiar with them. Any information which you can give him will be very much appreciated.

Very truly yours,
THE ALLEN SHERMAN HOFF COMPANY,
F. B. ALLEN.

FBA:H

# Pit and Quarry

With which is consolidated
CEMENT-MILL & QUARRY

Volume 24 APRIL 6, 1932 Number 1



Member Audit Bureau of Circulations

Published bi-weekly on Wednesday for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter October 9, 1928, at the Postoffice at Chicago, Ill., under the Act of March 3, 1879.



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*Next Issue April 20, 1932*

**Goodyear* THOR *Belting, seamless, is made in widths up to and including 16" —* THOR *quality of special construction is available for larger sizes*

# *The belt that stands up*
## UNDER CRUSHER-DRIVE SHOCKS

NO OTHER belt stands up like Goodyear THOR Belt, seamless,* under the smashing intermittent shocks of the crusher drive. The records of the rock products industry prove it.

Goodyear THOR is built for severest transmission duty. It is bodied with heavy silver-duck plies, stoutly cushioned and buttressed in high-strength rubber. It is extra strong at the fasteners—has *no center seam**—and is enclosed in *a staunchly protective envelope* that is part of the ply structure of the belt itself.

Goodyear Belts, Hose, Molded Rubber Goods and Packing are scientifically designed and carefully constructed by Goodyear for rock products industrial service, and are accurately recommended for their particular duty in your plant by the G.T.M. — Goodyear Technical Man.

You may save considerable money and much trouble by going over your mechanical rubber goods problems with the G.T.M. Write to Goodyear, Akron, Ohio, or Los Angeles, California, and ask him to call.

**TUNE IN:** Goodyear invites you to hear Arthur Pryor and his Band . . . Revellers Quartet and Goodyear Concert-Dance Orchestra . . . every Wednesday and Saturday night, over N.B.C. Red Network, WEAF and Associated Stations

THE GREATEST NAME IN RUBBER

GOODYEAR

**BELTS • MOLDED GOODS • HOSE • PACKING**

*The Standard Oil Company* (INDIANA) *Presents*

# REDUCING COST OF LUBRICATION

EIGHT factors must be considered individually and collectively if accurate and complete figures are to be obtained on the actual cost of lubrication. Likewise, all eight factors must be given attention in any effort to reduce lubrication costs.

Two of these factors are quite obvious:

A. OBVIOUS COSTS

1. Cost per unit quantity of lubricant.
2. Quantity of lubricant consumed.

They require no discussion as they are always taken into consideration. However, the "cost of lubricants" (unit cost multiplied by quantity used) is not the total lubrication cost. If figures of this kind are to be used at all they must be balanced against the following hidden factors which often are of much greater importance in determining the actual cost of lubrication.

B. HIDDEN COSTS

1. Power consumption.
2. Methods of application.
3. Servicing of lubricants.
4. Repairs.
5. Replacements.
6. Idle Machine Time.

Power consumption cost is many times greater than the cost of lubricants, thus the effect of lubricants on power consumption must be carefully considered. If too heavy a lubricant is used (either oil or grease), the excess fluid friction developed by this lubricant will increase power consumption.* Too light a lubricant will increase power consumption by allowing excess metal to metal contact of the moving parts. This also causes greater wear, affecting the item of repairs and replacements.

Methods of application greatly affect the efficiency of the lubrication obtained. These methods vary from simple devices to complicated mechanisms, each suited to a particular purpose. They must be reduced to simple, standard methods requiring the minimum of labor for application and the use of the smallest amounts of the most reasonably priced lubricant consistent with obtaining the best lubrication possible. An engineer with a thorough knowledge of this subject should be consulted if these methods are to effectively reduce "lubrication costs."

Servicing of lubricants is an important item. Labor costs incurred in the application of a lubricant must be charged to lubrication costs. It involves considerable expense in labor charges alone to dismantle a turbine oil or similar system, clean it and fill it with fresh oil; and to this should be added any overhead accruing to idle machine time. One-half or more of these periods of servicing often may be eliminated with the use of the proper oil, thus greatly reducing the cost of lubrication.

Repairs that have been caused by faulty lubrication must be charged to "lubrication costs." This item, involving as it does both parts and labor, often is five times the cost of lubricants and will have a very marked effect on the total amount charged to lubrication.

Replacements often are necessary because of faulty lubrication. While not a direct "repair" charge, inasmuch as "replacements" are budgeted in predicting costs, excess replacements that could be eliminated by proper lubrication should be so charged. As the cost of unnecessary replacements in practically all cases is very much higher than the cost of the lubricant, it is an item of major importance in total lubrication costs.

Idle machine time charges are high. This is exceptionally so when the unit shut down halts a production line or cuts off a source of power. Units shut down for repairs or replacements because of faulty lubrication, should have their idle time charges placed under "lubrication costs," as should the time consumed in servicing and application of lubricants.

Because of the varied factors which go to make up the true cost of lubrication, it readily may be seen that no simple formulae can be developed which will solve the problem in all instances. Every plant presents individual problems, demanding specific study. In many cases it will be found profitable to secure the service and advice of an experienced, competent lubrication engineer if the most efficient, most economical practices are to be found, developed and followed.

To further assist you in checking your lubrication, monographs will appear each month which will deal with the lubrication problems of particular types of machines or processes. They will be specific and full of helpful information.

*$F \left\{ \frac{Z\,N}{P} \right.$

F — Coefficient of friction for the bearing in question.
Z — Viscosity of the oil in absolute units (or centipoises).
N — R. P. M. of shaft.
P — Load on bearing in pounds per square inch of projected area.

The next monograph which will appear during May, will be on the lubrication of steam engines

# Standard Oil Company (INDIANA) Lubrication Service

APPLY to your own particular problems the principles involved in lubrication costs which are outlined on the opposite page. Perhaps the solution will suggest itself. Perhaps you will decide you need engineering advice.

The Standard Oil Company (Indiana) maintains a large staff of highly trained lubrication engineers of wide and varied experience. In their investigations they have at their command the facilities of our thoroughly equipped research and testing laboratories, all of which are available, without cost, to any plant or industry in the Middle West having problems of lubrication to solve.

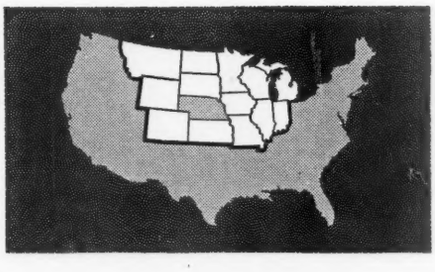
Under today's economic conditions, knowing the cost of every operation and method used in your plant is of first importance to you. These men can help you gather this information. Careful study of lubrication practices often reveals substantial economies which may be effected by eliminating hidden cost items heretofore considered necessary expense.

It is through the services of this highly specialized staff of engineers plus a complete line of industrial lubricants that this company's large volume of industrial business has been won and held. It explains why the Standard Oil Company (Indiana), with distribution facilities confined within thirteen Mid Western States, sells a larger amount of industrial lubricants than any other oil company does in the entire United States. It also accounts for the fact that the company enjoys so nearly 100% of the lubrication business of plants it serves. Effective, economical lubrication in customers' plants is the major consideration with Standard Oil Company (Indiana).

Every facility at our command to accomplish this is available to any industry in the Middle West. Members of our engineering staff are located at the branch offices below. Call on them for any assistance you may desire. If you have a lubrication problem needing study they will be glad to undertake the work, and will give you thoroughly scientific advice on the lubrication methods and type and quality of lubricants, which will give the most effective results in your plant at the least total cost of lubrication. This service is without cost to you.

A request made at any of the addresses listed below will bring one of these men to see you.

*CONCENTRATED FACILITIES FOR*



*SERVING THE MIDDLE WEST*

## Standard Oil Company
(Indiana) 1804

**910 S. Michigan Ave. Chicago, Illinois**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Billings | Decatur | Detroit | Fargo | Huron | Kansas City | Mason City | Minot | South Bend | St Louis |
| Cheyenne | Denver | Duluth | Grand Rapids | Indianapolis | La Crosse | Minneapolis | Peoria | Saginaw | St. Joseph |
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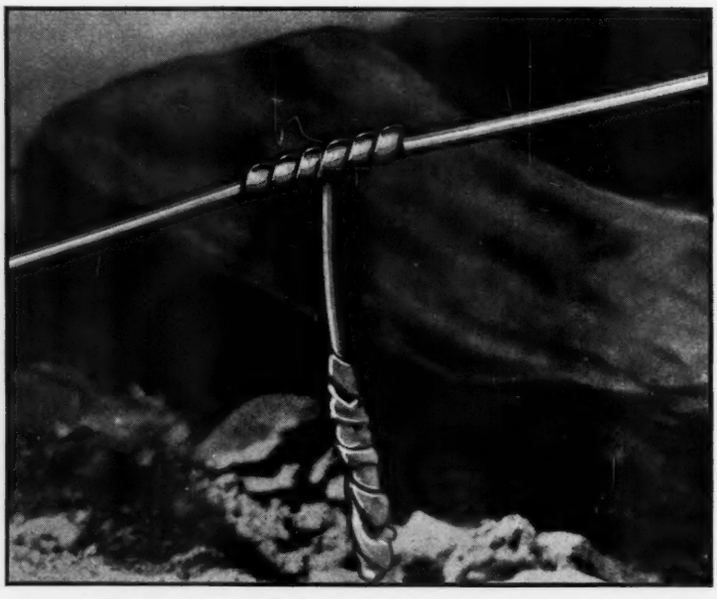
# At 3 miles a second *connections are important!*

In a big shot there is one sure line of communication for the explosive wave, and that is the network of Cordeau. The main lines will always carry the wave to all holes and the branch lines pick it up at their connections.

But with a speed of more than 3 miles a second, these connections are vitally important. They must be right, they must be tight. They must be protected from moisture.

When weeks of preparation, tons of dynamite, and miles of Cordeau are invested in a single shot, it certainly pays to exercise every precaution while making the hookup. Place the main line into the crotch of the branch line, seat firmly and wrap it securely. Put your detonators on the main lines; never on a branch line.

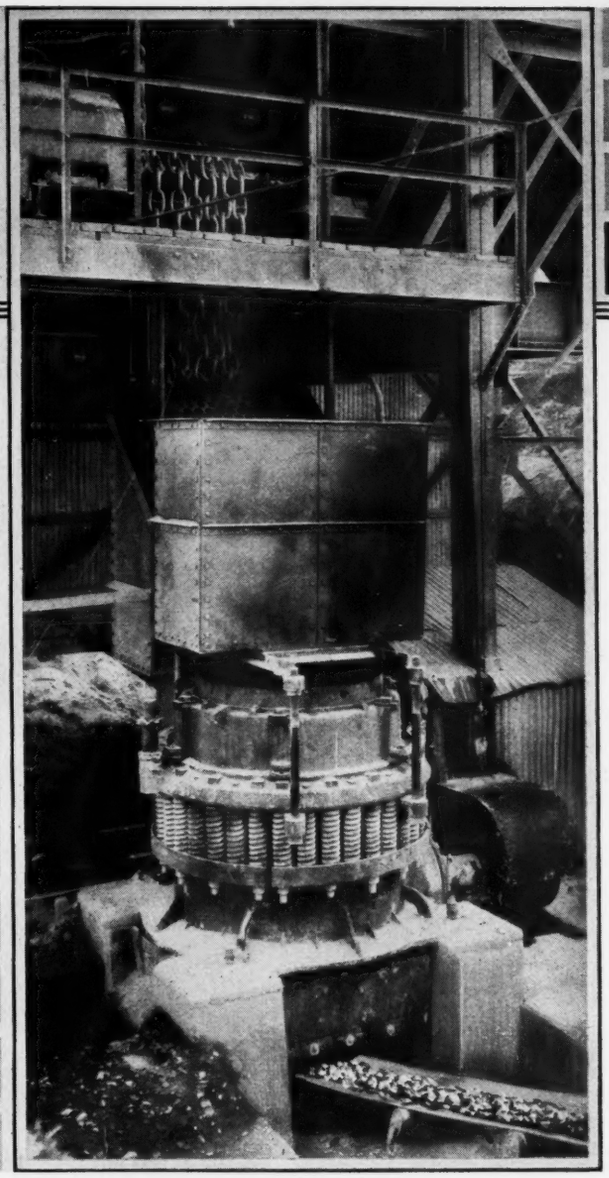
Our Cordeau Booklet contains some very complete diagrams you may find helpful. The Ensign-Bickford Company, Simsbury, Conn.



CORDEAU
DETONATING FUSE
BICKFORD

# SYMONS CONE CRUSHERS

## —ANSWER THE REDUCTION CRUSHING PROBLEM WITH— PERFORMANCE



This 4 foot installation is typical of the hundreds of Symons Cone Crushers that are doing the reduction crushing at mines, stone, slag and gravel plants. There are five sizes to choose from, one that will meet your capacity requirement.

**"For the reduction crushing, a Symons Cone has been installed." This is a statement commonly heard today.**

Symons Cone Crushers have been installed in most of the newer modern crushing plants built in recent years that deliver fine products in quantity. About 90 percent of the obsolete crushers taken out of existing plants are being replaced with Symons Cones.

There is a reason for the rapid trend toward the Symons Crusher and that reason is PERFORMANCE. Its capacity for fine crushing is unequalled. Its ability to deliver a big tonnage at low cost makes it use imperative to show profitable operation in these days of close competition and more rigid material specifications.

**NORDBERG MFG. CO.** MILWAUKEE, WISCONSIN

LONDON, WC2, ENG., Bush House NEW YORK, 51 E. 42nd St. LOS ANGELES, 1462 Stanley Ave.

*Other Nordberg Products*

DIESEL ENGINES . . . STEAM ENGINES . . . AIR AND GAS COMPRESSORS . . . MINE HOISTS
RAILWAY TRACK MAINTENANCE MACHINERY . . . UNDERGROUND SHOVELS

LIMA "101"

# DON'T WORRY ABOUT THE ROCK CUTS

Don't worry about the rock cuts the LIMA "101" will handle them with the same ease as when working in loose, easy digging.

The abundance of power which constantly keeps the LIMA "101" dipper against the bank flows without interruption from the mighty power unit through Timken Roller Bearings ALL THE WAY. There are no bronze or babbitt bearings in the LIMA "101".

Furthermore, this exclusive anti-friction bearing principle of the LIMA "101" eliminates chattering and grabbing clutches and all other destructive vibrations.

Lima has made it possible to hold the dipper to the work regardless of how hard the digging.

THE OHIO POWER SHOVEL CO.
Division Lima Locomotive Works, Incorporated
LIMA, OHIO

Western Office
2026 Straus Bldg.,
Chicago

Canadian Representatives
The General Supply Co. of Canada Ltd., Ottawa, Ont.
Tyee Machinery Co., Lt., Vancouver, B. C.

Eastern Office
319 Frelinghuysen Ave.
Newark, N. J.

TIMKEN BEARING EQUIPPED

The LIMA "101" is the only shovel in the world equipped throughout with roller bearings—a Timken at every vital bearing point.

# LIMA "101"

# CUT COSTS...BY USING PREFORMED WIRE ROPE

## TODAY, EFFICIENT PRODUCTION IS OF UTMOST IMPORTANCE...

The above statement needs no amplification. Heads of industries know too well the need for judicious pruning of overhead costs. This is why users of wire rope check up on RESULTS... and why more and more each month, TRU-LAY is purchased in greater quantities. "All wire rope is alike" is no longer a buying index.

**1** Cross your fingers like this. Feel the internal stress in your finger muscles.

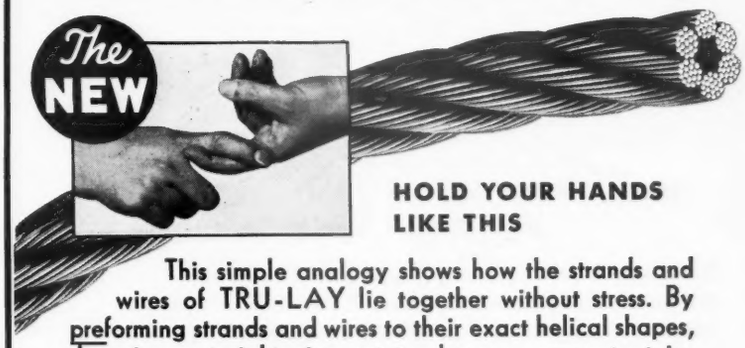
This illustrates how strands and wires of ordinary (non-preformed) wire rope are subjected to a constant internal fatigue . . . because they are forced to hold their helical shapes.

**2** Now move your middle finger. Note the rubbing action . . . demonstrating how, in ordinary wire rope, the ever existing straightening-out effort of the strands and wires causes excessive internal friction.

**3** Let your fingers snap apart. Note how your fingers spread apart when you let them snap, as illustrated above. Strands and wires of ordinary (non-preformed) wire rope do the same when internal stress is released by removal of seizing.

### ELIMINATION OF INTERNAL STRESS RESULTS IN 30% TO 300% INCREASED SERVICE WITH TRU-LAY . . . . .

Practically every use for wire rope is represented in our many testimonials on TRU-LAY, as compared with ordinary (non-preformed) wire rope service. These unbiased service comparisons—of ropes operating under identical conditions, proves in some cases as high as 300% increased service with TRU-LAY . . . never under 30%. *The size, style and material being the same, the increase in service with TRU-LAY must be due to its preformed construction.*




**HOLD YOUR HANDS LIKE THIS**

This simple analogy shows how the strands and wires of TRU-LAY lie together without stress. By preforming strands and wires to their exact helical shapes, there is no straightening-out tendency—no constant internal stress. The result is less fatiguing action, longer life, easier handling, greater flexibility, just to mention a few of the advantages of TRU-LAY.

Let us send you more facts. Address:

AMERICAN CABLE COMPANY, *Inc.*
New York Central Bldg., 230 Park Ave., New York, N. Y.
An Associate Company of the American Chain Company, *Inc.*
*District Offices:*
Atlanta, Chicago, Denver, Detroit, Philadelphia, Pittsburgh, Tulsa, San Francisco

ACCO

## TRU-LAY PREFORMED WIRE ROPE

**30% to 300% Increased Service** [ *Depending upon the character of the service and type of equipment*

# NEW all

DRIES AS IT GRINDS

*THE NEW RAYMOND ROLLER MILL equipped with Air Separation and Air Drying. Highly efficient for drying materials while pulverizing. A compact, double-duty unit that reduces the cost of producing powdered materials as much as 20% to 50%. Dustless in operation as system is always under suction. Built in all sizes up to forty tons per hour capacity.*

# RAYMOND

## BROS. IMPACT PULVERIZER CO.

# the way through *and why*

THE NEW RAYMOND ROLLER MILL is here—new in construction, new in performance, new in economy. Its coming is timely, for the pulverizing industry is making urgent demands for better and cheaper methods of production of powdered materials.

All the resources of the Raymond organization—experience, research, engineering skill—have been centered upon the development of a mill to increase the profits of producers.

The result is this complete plant for the manufacture of powdered materials at a low level of costs. It is a combination dryer-pulverizer, equipped to do the whole job from start to finish in one continuous operation.

## *The Robot of the Rock Products Field*

As the New Raymond Roller Mill automatically dries and grinds the material at the same time, it is specially adapted for pulverizing limestone, gypsum, phosphate rock and similar products containing residual moisture. Large savings are made possible because it—

Operates as a Kiln Mill with air drying
Maintains maximum milling capacity
Handles the material wet or dry
Eliminates separate dryers
Utilizes waste heat

Investigate this modern method of pulverizing. It simplifies manufacture and assures marked economies in power, labor and maintenance.

Write and tell us your requirements—we offer you an engineering service, backed by 45 years' experience.

RAYMOND BROS. IMPACT PULVERIZER CO.
Main Office and Works:
1321 North Branch Street, Chicago

342 Madison Avenue
New York

Subway Terminal Bldg.
Los Angeles

*Ask for the 1932 Bulletin of the New Raymond Roller Mill. It gives details and applications of this latest type of pulverizing unit.*

THE NEW OIL JOURNAL
Cuts maintenance and lubrication costs to a minimum.

PNEUMATIC FEED CONTROL
Keeps maximum load on mill at all times.

CONCENTRATOR COLLECTORS
Clean vented air of fine dust.

IMPROVED FAN ARRANGEMENT
Exhauster free from abrasive dust.

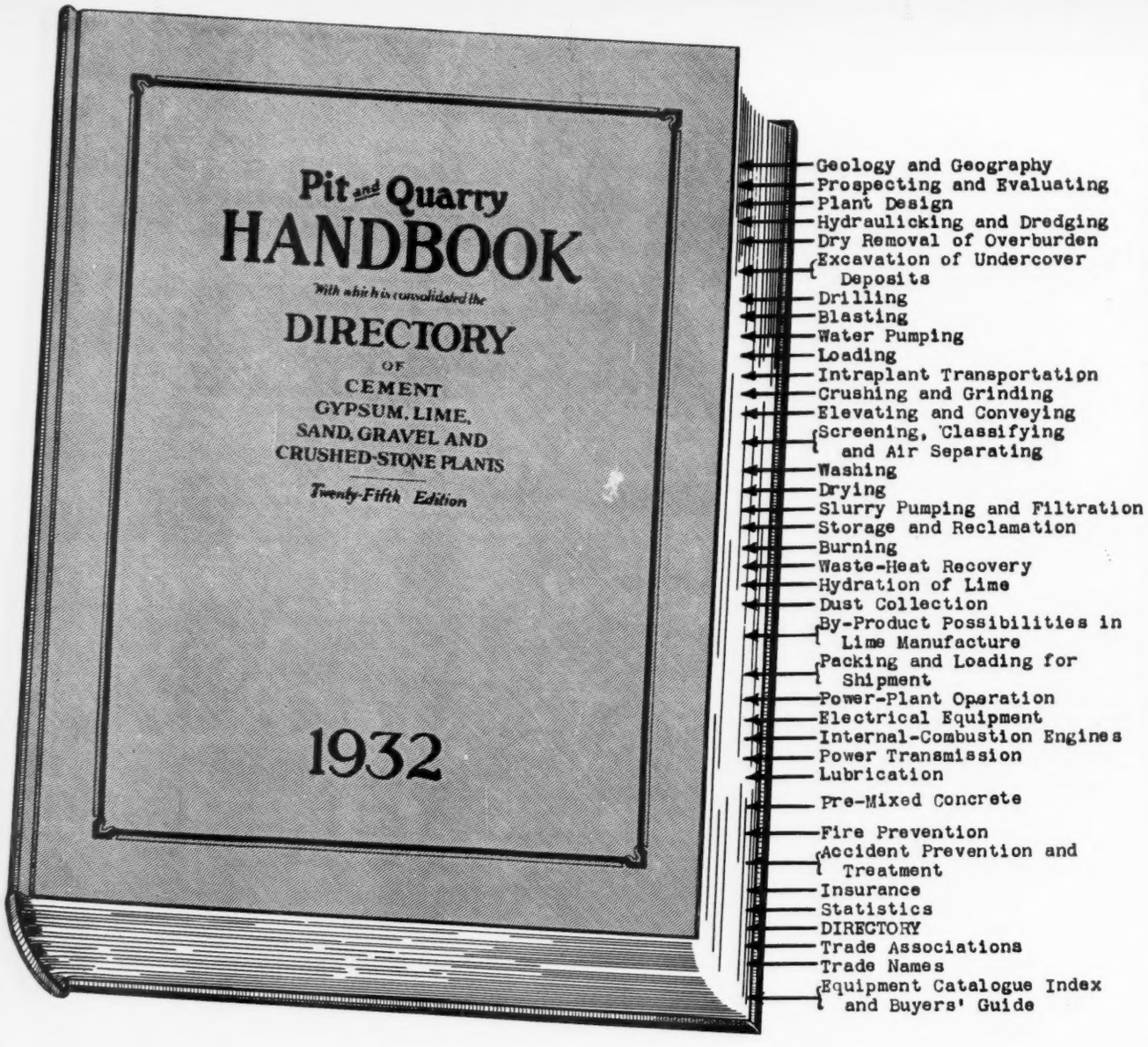
THERMOSTATIC CONTROLS
Regulate air temperature of system and rate of evaporation.

WELDED STEEL SEAMS
Insure dust-tight piping and collectors.

MECHANICAL REFINEMENTS
Improvements that cut power and repair costs—give greater flexibility of control—increase capacity—and insure more constant fineness of product.

MASSIVE CONSTRUCTION
Extra metal in base castings to minimize vibration—heavier gauge plates for increased durability—more sturdily built from top to bottom, adding years of service life to the New Raymond Roller Mill.

PULVERIZING, SEPARATING, AIR DRYING AND DUST COLLECTING EQUIPMENT




# Here It Is, at a Glance—Brand New!

The illustration above shows, graphically, the contents of the 1932 edition of Pit and Quarry HANDBOOK and Directory, just off the press. The only book of its kind. Every section has been brought right up to the minute. The Directory is the largest and most complete listing of producers ever compiled—and every item is *verified*.

If you have not already purchased your copy of this indispensable book, order now, before the limited printing is exhausted.

| | | | |
|---|---|---|---|
| Pit and Quarry Handbook and Directory, 1932 edition..... | $5.00 | Clubbed with a 1-year subscription to Pit and Quarry..... | $6.00 |
| Pit and Quarry Handbook and Directory, 3 consecutive editions.. | $12.00 | Clubbed with a 3-year subscription to Pit and Quarry..... | $15.00 |

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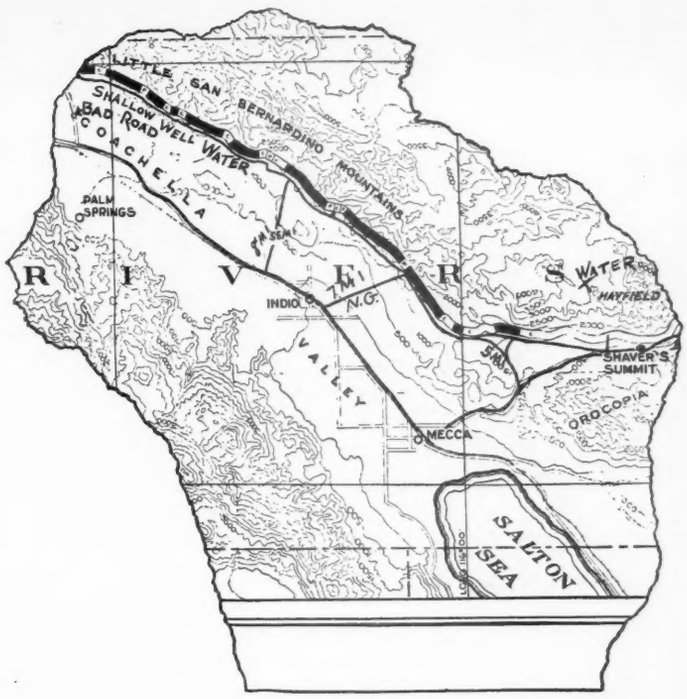
## Pit and Quarry Publications

538 S. Clark St., Chicago, Ill.

PIT AND QUARRY HANDBOOK  PIT AND QUARRY  PIT AND QUARRY DIRECTORY

*This section torn from an Atlas contract service map will interest you. The map shows just the details a contractor needs to begin his study of a new job . . . and adds to the value of good explosives.*



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**ATLAS POWDER COMPANY**

A proper explosive for every blasting requirement

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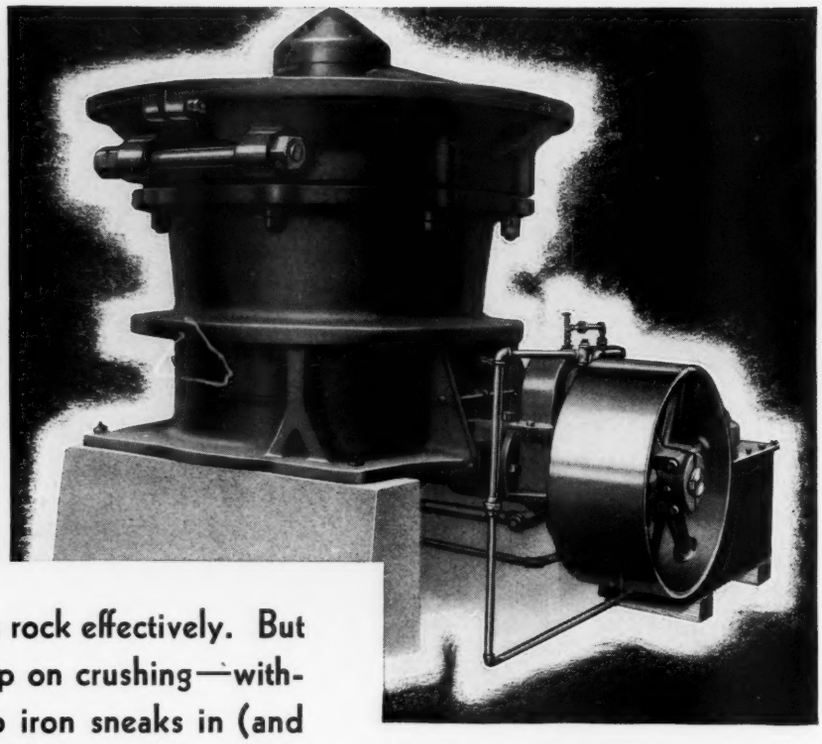
ATLAS EXPLOSIVES

# ATLAS EXPLOSIVES

**ON THE WEST COAST · THE GIANT POWDER CO., CONS., SAN FRANCISCO**

# All Crushers Look Alike to Tramp Iron • • •

## • *all except* TELSMITH



It's a crusher's business to crush rock effectively. But that isn't enough. It must keep on crushing—without breakdowns. When tramp iron sneaks in (and try to keep it out) it's just too bad for the ordinary crusher. But it's worse for the man who has a production schedule to maintain.

If the Telsmith crusher had no other outstanding advantages . . . the fact that Telsmith's super-strong frame and crown are steel . . . its shaft unbreakable . . . and all three are guaranteed against breakage, even by tramp iron, would be enough.

New engineering advancements in this year's Telsmiths have increased crushing speed and capacity . . . added to the life of the machine . . . and reduced maintenance cost. How? . . . Bulletin C-15 gives you the details on both Telsmith Coarse and Fine crushers. Write for it.

**TELSMITH**

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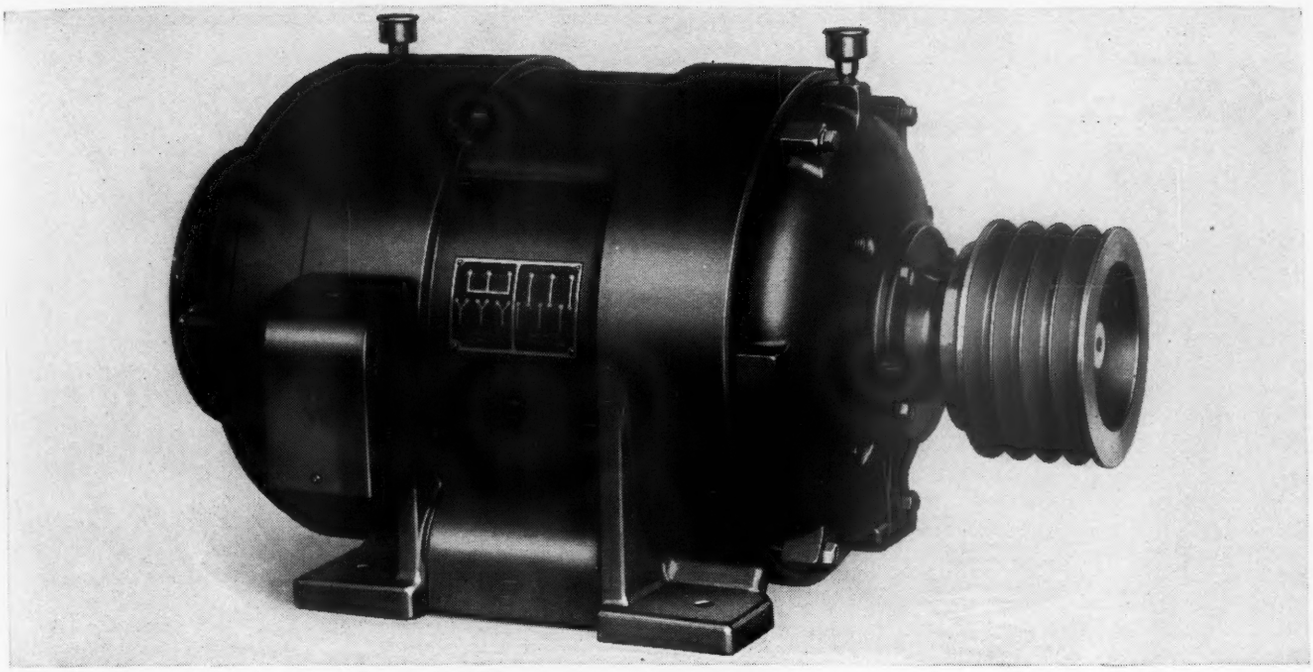
B-24



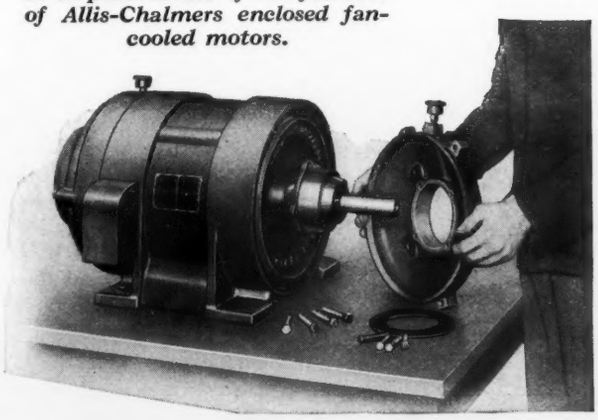
# Your Maintenance Man Knows
## the Value of these Enclosed Motors

HE knows that where dust, dirt, moisture, dripping water, or destructive gases are present . . . . those drives in out of the way places where motor windings become clogged or moisture soaked . . . . there, Allis-Chalmers enclosed fan-cooled motors reduce trouble and operating expense.

He knows that sturdy construction, liberal design, and unexcelled insulation are features of Allis-Chalmers motors and that the enclosed-fan-cooled type, while thoroughly protected, is readily accessible.

Allis - Chalmers enclosed fan - cooled motors approved by the Underwriters for dusty locations are described in Leaflet 2124. Explosion-proof motors, also approved, are described in Leaflet 2125-A.

*Complete and ready accessibility to all parts is one of the features of Allis-Chalmers enclosed fan-cooled motors.*



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**ALLIS-CHALMERS MOTORS**

# Handle Material THE MONARCH WAY

THIS means—the profitable way. MONARCH Bucket Elevators are handling thousands of tons of material under various operating conditions, and returning maximum profits for the operators.

MONARCH Bucket Elevators are efficiently designed and substantially built of wear-resisting material to assure long life, regardless of the demands placed upon them.

MONARCH Bucket Elevators are equipped with the well known Monarch Wing Type Pulley. This pulley offers the greatest protection to your belt and eliminates those premature repairs and replacements as material cannot lodge between belt and pulley—a belt destroying feature of ordinary pulleys.

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Our line includes: Elevators and Conveyors for all materials. Screw Conveyors; Bucket Elevators; Belt Conveyors; Apron Conveyors; Coal and Ash Handling Equipment; Hoists, Car Pullers; Buckets; Gears; Sprockets; Clutches; Pulleys; Bearings; Take-ups and other Transmission Appliances; Crushers; Grinders; Dust Collectors; Reels and Vibrating Screens; Bag and Barrel Packers; Sheet Metal and Plate Fabricators.

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VOLUME 24 NUMBER 1

Pit and Quarry
With which is consolidated
CEMENT-MILL & QUARRY
CHICAGO, APRIL 6, 1932

## Pennsylvania Stone Producers Assemble

### FORMER OFFICERS REËLECTED

Officers who served during the past year were reëlected to guide the affairs of the Pennsylvania Stone Producers' Assn. for 1932 at a meeting of the organization held March 11 at the Penn-Harris Hotel, Harrisburg, Pa. The officers include: F. O. Earnshaw, president; S. W. Stauffer, vice-president; and P. B. Reinhold, secretary-treasurer.

Routine business occupied the meeting for the most part. A lengthy discussion took place regarding the merits of the proposed Davis-Bacon and Almon bills in the House of Representatives having to do with the appropriation of $132,000,000 for highway work under the direction of the U. S. Department of Agriculture. A resolution was drawn up opposing certain features having to do with determining the wages to be paid workers and copies were ordered mailed to congressmen and senators.

W. M. Andrews and Mr. Reinhold were appointed to represent the association at a joint meeting with the other aggregates producers and the Pennsylvania Contractors' Assn. to determine the advisability of forming a state credit bureau. The meeting is scheduled to be held some time this month. Mr. Andrews and R. F. Hogan were also appointed to confer with representatives of the railroads for the discussion of matters concerning specifications for ballast and crushed-stone aggregates.

Pennsylvania producers who attended the meeting included:

H. B. Allen, General Crushed Stone Co., Philadelphia, Pa.
W. M. Andrews, Lake Erie Limestone Co., Youngstown, O.
A. G. Barres, General Crushed Stone Co., Wilkes-Barre, Pa.
F. W. Cramer, York Valley Lime & Stone Co., York, Pa.
H. J. Filer, Grove City Limestone Co., Sharon, Pennsylvania.
Ellwood Gilbert, New Castle Lime & Stone Co., New Castle, Pa.
Wm. S. Giles, Vang Crushed Stone & A. Co., Pittsburgh, Pa.
R. E. Graul, Northampton Quarry Co., Northampton, Pa.
O. M. Graves, General Crushed Stone Co., Easton, Pa.
F. T. Gucker, The John T. Dyer Quarry Co., Norristown, Pa.
C. T. Heiberger, C. H. Ziegenfuss Co., Allentown, Pa.
J. A. Hipple, Penn Lime & Stone Co., Rheems, Pennsylvania.
R. F. Hogan, Warner Co., Philadelphia, Pa.
M. L. Jacobs, Bethlehem Mines Corp., Bethlehem, Pa.
R. K. Kibblehouse, Ambler, Pa.
H. H. Meyer, Allegheny River Limestone Co., Pittsburgh, Pa.
H. E. Nauss, Steacy & Wilton Co., Wrightsville, Pa.
H. S. Nice, R. K. Kibblehouse Co., Ambler, Pennsylvania.
R. C. Noll, Whiterock Quarries Co., Bellefonte, Pa.
S. F. Plachecki, Enterprise Lime & Ballast Co., Tyrone, Pa.
S. F. Plachecki, Jr., Enterprise Lime & Ballast Co., Tyrone, Pa.
P. B. Reinhold, Reinhold & Company, Inc., Pittsburgh, Pa.
John Rice, Jr., General Crushed Stone Co., Easton, Pa.
A. L. Sheffer, National Limestone Co., Naginey, Pa.
D. K. Shrayer, H. E. Millard Co., Annville, Pennsylvania.
S. W. Stauffer, J. E. Baker Co., York, Pa.
R. S. Walker, Chemical Lime Co., Inc., Bellefonte, Pa.
H. H. Wilson, Lime Bluff Co., Inc., Harrisburg, Pa.

## Canada Cement Co. Puts New Plant in Operation

Operations have been started by Canada Cement Co., Ltd., at its entirely rebuilt plant at Port Colborne, Ont. The new plant employs the wet process, one long kiln being used in the burning, and represents an investment of more than $1,000,000. It is expected that 220 men will ultimately be employed.

## To Spend $1,000,000 on New Quarry and Plant

Plans have been approved by the Metropolitan Commission of Montreal for a million-dollar improvement program to be started shortly by National Quarries, Ltd. Plans include the acquisition of deposits at Cote St. Michel where a modern crushed-stone plant will be erected.

## New Limestone Plant in Indiana to Open Shortly

The Diamond Limestone Co. is ready to begin production at its new plant and quarry located near Huntington, Ind. A jaw crusher and hammer-mill have recently been installed. Commercial aggregates as well as agricultural stone are to be produced.

## 28 Alleged Silicosis Victims Ask Damages

### TOTAL OF $982,500 DEMANDED

Damages totalling $982,500 are being sought in 28 separate suits filed by employees and former employees of the Ottawa Silica Co. of Ottawa, Ill., following their alleged contraction of silicosis while working in the plant and silica-sand quarries of the company located near Ottawa in the heart of the famous silica-sand area.

Included among the plaintiffs who are demanding damages are Albert Carter, who asks $25,000; Albert McKinley, who seeks $50,000; Jules Metille, $37,500; Edwin Nelson, $35,000; Lowell H. Hoxie, $25,000; Garland Nelson, $10,000; Edward Smith, $10,000; Frank Davis, $45,000; James Mooney, $20,000; and Michael McKenna, $25,000.

The almost wholesale filing of the suits follows the recent decisions of courts at Ottawa, Streator and LaSalle, Ill., wherein former workers who contracted silicosis were awarded substantial claims for damages from silica-sand operators in that vicinity.

## Five Long Island Gravel Producers Consolidated

The Local Sand & Stone Co. has been formed at Mineola, N. Y., through the merger of five companies producing sand and gravel in Nassau County. The companies who joined in the consolidation were the George McCloud Corp.; Hendrickson Brothers; the Charles Young Co.; Seaford Sand & Gravel Co.; the C. B. Trucking Corp.

Officers include Frank Hendrickson, president; Larry Randall and Charles Young, vice-presidents; Walter Smith, secretary; Ralph Caldwell, treasurer.

## New York Cement Plant Is Back in Production

Operation was resumed early this month at the Greenport, N. Y., plant of Lone Star Cement Co., New York. The plant had been idle more than two months, due to lack of demand and the necessity for making repairs.

## $1,353,000,000 to Be Available for Roads

### PENNSYLVANIA TO TAKE LEAD

Funds estimated as available for public road and bridge construction and maintenance in 1932 amount to $1,353,000,000, according to information collected from road officials by the Bureau of Public Roads, U. S. Department of Agriculture. Of this amount $882,000,000 is the probable expenditure by state highway departments, and $471,000,000, it is expected, will be spent by local authorities.

The detailed total of road and bridge expenditures in 1931 is not yet known but the 1932 program is less by 19 per cent. than the total rural road expenditure of $1,680,000,000 in 1930. Comparing state highway expenditures of $980,000,000 in 1930 with similar funds available for 1932, there is a decrease of 10 per cent. Similarly there is a decrease of 33 per cent. in local funds, the 1930 expenditure having been $700,000,000.

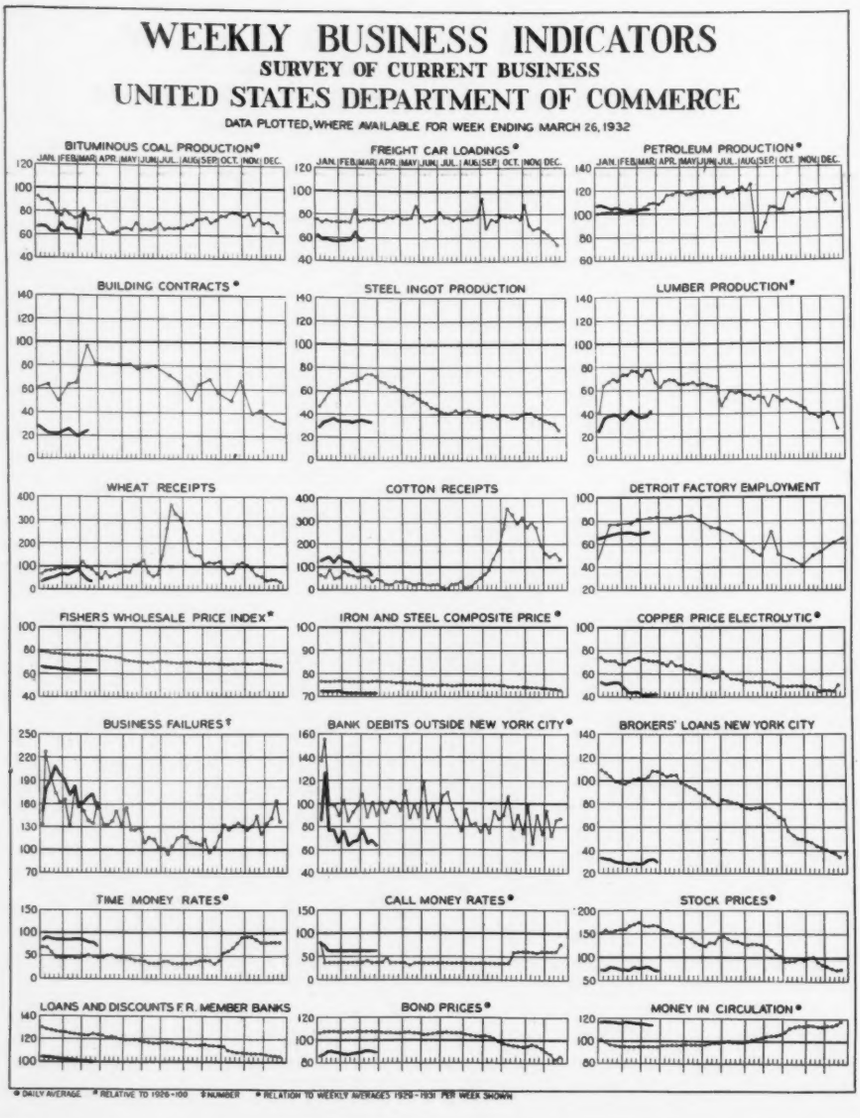
The state highway funds have declined considerably less than local funds because they are derived in large part from motor vehicle and gasoline taxation and there has been no marked reduction in these revenues. The local road funds also participate in these revenues but not to the same extent.

The total estimated expenditure of the state highway departments of $882,000,000 is divided as follows: Construction of roads and bridges, $568,000,000; reconstruction and maintenance, $197,000,000; interest on highway bonds, $64,000,000; and miscellaneous, $53,000,000.

The state highway departments plan to construct 36,000 miles of road. This mileage includes 8,800 miles of high-type road such as asphalt, concrete, and brick; 17,500 miles of macadam, gravel and sand-clay; and 9,000 miles of graded earth. There is also to be constructed approximately 700 miles of road in New York not distributed by types and the mileage to be constructed in Connecticut and Florida is not included. The state highway departments will maintain 314,900 miles of road. Similar information concerning local funds and mileage is not available.

The states with highway programs in excess of $50,000,000 are listed in order of size of program as follows: Pennsylvania, New York, Illinois, California, New Jersey, Ohio, Texas, Missouri, Michigan.

The local program of road construction will exceed $25,000,000 in the following states, which are listed in order of size of program: Pennsylvania, New York, California, Ohio, Illinois.


WEEKLY BUSINESS INDICATORS
SURVEY OF CURRENT BUSINESS
UNITED STATES DEPARTMENT OF COMMERCE
DATA PLOTTED, WHERE AVAILABLE FOR WEEK ENDING MARCH 26, 1932
BITUMINOUS COAL PRODUCTION*
FREIGHT CAR LOADINGS*
PETROLEUM PRODUCTION*
BUILDING CONTRACTS*
STEEL INGOT PRODUCTION
LUMBER PRODUCTION*
WHEAT RECEIPTS
COTTON RECEIPTS
DETROIT FACTORY EMPLOYMENT
FISHER'S WHOLESALE PRICE INDEX*
IRON AND STEEL COMPOSITE PRICE*
COPPER PRICE ELECTROLYTIC*
BUSINESS FAILURES†
BANK DEBITS OUTSIDE NEW YORK CITY*
BROKERS' LOANS NEW YORK CITY
TIME MONEY RATES*
CALL MONEY RATES*
STOCK PRICES*
LOANS AND DISCOUNTS F.R. MEMBER BANKS
BOND PRICES*
MONEY IN CIRCULATION*
* DAILY AVERAGE † RELATIVE TO 1926-100 ‡ NUMBER * RELATION TO WEEKLY AVERAGES 1929-1931 PER WEEK SHOWN

## Furnishing Aggregates for Radio City Project

More than 600 barge-loads of sand and gravel and crushed-stone is being supplied the new Rockefeller Radio City project in New York by the Colonial Sand & Stone Co. Considerable material has already been furnished, sand and gravel coming from Long Island pits, while the stone is largely trap rock quarried up the Hudson River. An unloading terminal has been established at 52nd St. and the river.

## Prospects Appear Rosy to Alabama Lime Maker

Continuous operation throughout 1932 is in prospect for the Superior Lime & Hydrate Co., of Pelham, Ala., according to H. G. Bridgwater, head of the company, who recently closed a number of substantial contracts with southern users. Three 8-hr. shifts are now operating, producing 700 bbl. of white lime and hydrate daily.

The plant is located 20 miles from Birmingham and has the benefit of shipping facilities of two railroads.

## Asphalt Technologists Create New Committees

Two new standing committees to study and report on new phases of asphalt technical development for the organization have been created by the Association of Asphalt Paving Technologists. These committees are the Committee on Asphalt Plant and Equipment, of which John W. Davitt, a well-known asphalt machinery consultant of Jersey City, N. J., is chairman, and the Committee on Production of Asphalt Cement, of which Charles M. Baskin, asphalt technologist for the Imperial Oil Refineries, Ltd., Montreal, Que., is the chairman.

The purpose of Mr. Davitt's committee is to devise and recommend improvements in asphalt mixing and paving plants and other equipment that will insure a better quality and quantity of output and effect economies in operation. The committee headed by Mr. Baskin will develop information on the characteristics of asphalt cements as they relate to the various processes of production, with a view to furnishing engineers advice

and assistance that will enable them to prepare paving mixtures best adapted to meet particular conditions that may confront them in their local situations. The members of the two new committees will be appointed by the chairmen in the near future. Messrs. Davitt and Baskin also were elected to the Board of Directors at this meeting.

The following officers have been elected for the year 1932: President, Henry L. Howe, Rochester, N. Y.; First Vice-President, Roger L. Morrison, Ann Arbor, Mich.; Second Vice-President, George W. Craig, Chicago, Ill.; Secretary-Treasurer, Charles A. Mullen, Montreal, Que., Canada.

## Silica-Sand Producer to Build Plant in Kentucky

The Tavern Rock Sand Co. of Toledo, O., whose silica-sand plants are located at Klondike, Mo., and Millville, N. J., has acquired a 275-acre silica deposit at Enterprise, Ky., where another plant is to be erected this spring, it is reported.

T. A. Graham, who has been located at the Millville, N. J., operations, will be in charge of the plant, according to press reports.

## Rebuilds Crushed-Stone Plant Damaged by Blaze

The LeMoyne Quarries Co. of LeMoyne, Pa., which recently suffered a fire at its plant causing about $25,000 damage, is reported to be proceeding with plans for rebuilding. New crushers, an air compressor, and several motors and drills are to be purchased, it is said.

## Crushed-Stone Operator to Produce Sewer Pipe

The Wakefield Crushed Stone Co. of Ironwood, Mich., has completed arrangements for the installation of machinery at its plant for the manufacture of sewer tile.

The company was induced to enter into the manufacture of pipe through the influence of Ironwood municipal officials, who have already contracted for a considerable portion of the output of the unit. W. S. Peters is president of the company.

## Four Producers Share Columbus, O., Awards

Four aggregates producers will share in furnishing the needs for material of the city of Columbus, O., during the year, following the recent awards by the municipality.

The largest portion—10,000 tons—will be supplied by the Marble Cliff Quarries Co. on its bid of $1.45 per ton. Other awards were American Aggregates Co., crushed gravel, $3,825; Arrow Sand & Gravel Co., 4,000 tons of pea gravel at 70 c. per ton; and Ohio Sand & Gravel Co., 4,500 tons of river-run and bank gravel, $4,645.

## Yosemite Cement Office Moved to San Francisco

The main office of the Yosemite Portland Cement Corp., which has been located at Merced, Cal., has been transferred to San Francisco. Sales offices have been maintained at San Francisco for some time and the move to consolidate the administrative and selling forces was made in the interests of economy and efficiency, according to George A. Fisher, general manager.

The Yosemite plant at Merced is operating at one-half capacity. The quarry is located at El Portal, Cal.

## Lehigh Lands Order for Cement for Post-Office

The Lehigh Portland Cement Co. plant at New Castle, Pa., will supply 75,000 bbl. of cement to be used in the construction of the new post office at Pittsburgh.

Announcement of the closing of the contract was made by Robert E. Long, sales manager of the company.

## Californian Projects Plans for a Big Plant

### 66-ACRE TRACT IS ACQUIRED

Plans are said to be going forward rapidly for the construction at Roscoe, Cal., near Los Angeles, of a $750,000 cement-products and crushed-stone plant. John D. Gregg, California capitalist, is reported to be the financial backer of the project and the plant, which will be constructed this summer, according to press reports from California, will employ over 200 men when working at full capacity.

A tract of deposits covering 66 acres has been acquired by Mr. Gregg, it is reported, adjoining the areas of stone now being quarried by the Consolidated Rock Products Co. and Graham Bros., both of Los Angeles.

Considerable difficulty in obtaining railway rights to the property is all that is holding up its immediate development, it is said.

## Alaska Marble Quarries Open; Closed Since 1928

The Alaska quarries of the Vermont Marble Co., closed since 1928, were reopened this month and barge shipments of marble for delivery to the company's plants at Tacoma and San Francisco will be begun June 1.

The quarries are at Tokeen, on Marble Island, about 100 mi. southwest of Wrangell. Two varieties of colored marble, known to the trade as Tokeen and Gravina and used for interior building work, are being produced.

A force of 70 men, headed by C. C. Thomas, assistant general superintendent of quarries of the company, sailed from Tacoma early in March.

The Vermont Marble Co. began operations in Alaska in 1908 and now owns several thousand acres of deposits there. Up to 1928 it had quarried nearly 1,500,000 cu.ft. of marble in its quarries in the far north.

**BUILDING PERMITS ISSUED IN FEBRUARY, 1932, SHOWING COMPARISONS WITH FEBRUARY, 1931, AND JANUARY, 1932**

| State | Feb., 1932 | Feb., 1931 | Jan., 1932 | State | Feb., 1932 | Feb., 1931 | Jan., 1932 |
|---|---|---|---|---|---|---|---|
| Alabama | $ 234,273 | $ 298,197 | $ 101,436 | Nebraska | $ 136,139 | $ 1,016,949 | $ 69,545 |
| Arizona | 58,053 | 257,296 | 68,649 | Nevada | 28,300 | 122,225 | 25,750 |
| Arkansas | 62,346 | 91,032 | 30,604 | New Hampshire | 10,340 | 25,160 | 34,066 |
| California | 6,340,875 | 11,351,514 | 5,283,618 | New Jersey | 1,383,779 | 2,709,835 | 2,247,052 |
| Colorado | 345,475 | 600,131 | 359,942 | New Mexico | 34,440 | 620,084 | 24,600 |
| Connecticut | 585,803 | 3,444,936 | 1,525,583 | New York | 9,807,021 | 33,149,931 | 17,214,409 |
| Delaware | 105,706 | 394,968 | 318,930 | North Carolina | 230,163 | 568,226 | 133,886 |
| District of Columbia | 1,015,620 | 5,159,315 | 1,304,725 | North Dakota | 5,525 | 68,000 | 10,680 |
| Florida | 676,295 | 701,860 | 417,159 | Ohio | 6,005,211 | 5,748,438 | 4,180,576 |
| Georgia | 145,310 | 328,676 | 229,768 | Oklahoma | 169,877 | 2,791,398 | 161,650 |
| Idaho | 29,064 | 64,940 | 16,620 | Oregon | 257,695 | 880,392 | 433,525 |
| Illinois | 1,353,505 | 10,401,776 | 662,110 | Pennsylvania | 1,702,686 | 2,731,712 | 1,501,029 |
| Indiana | 1,481,483 | 1,799,354 | 319,752 | Rhode Island | 296,587 | 287,415 | 296,509 |
| Iowa | 221,494 | 720,611 | 236,724 | South Carolina | 306,342 | 175,890 | 69,013 |
| Kansas | 83,188 | 286,587 | 92,085 | South Dakota | 28,185 | 206,990 | 17,500 |
| Kentucky | 153,395 | 422,320 | 105,660 | Tennessee | 776,461 | 691,829 | 360,040 |
| Louisiana | 318,402 | 502,448 | 169,697 | Texas | 1,848,877 | 5,760,771 | 1,804,006 |
| Maine | 213,531 | 49,370 | 52,385 | Utah | 29,139 | 210,522 | 29,685 |
| Maryland | 1,321,235 | 2,871,291 | 1,033,980 | Vermont | None | None | 11,000 |
| Massachusetts | 2,946,097 | 3,428,111 | 1,951,230 | Virginia | 381,229 | 395,614 | 433,381 |
| Michigan | 657,444 | 2,978,876 | 583,713 | Washington | 320,795 | 1,449,408 | 1,902,633 |
| Minnesota | 556,684 | 1,402,618 | 645,856 | West Virginia | 81,925 | 164,038 | 119,797 |
| Mississippi | 939,825 | 22,908 | 5,743 | Wisconsin | 996,043 | 1,931,845 | 987,104 |
| Missouri | 626,082 | 2,024,805 | 622,410 | Wyoming | 7,775 | 19,430 | 1,698 |
| Montana | 11,000 | 139,255 | 28,630 | Totals | $45,326,719 | $111,469,297 | $48,225,143 |

# Editorial

## *The Five-Day Week*

NEW ideas take root slowly, because our innate dislike of change builds a wall of extreme conservatism with which we meet every proposal that offers a different situation from the one to which we have been accustomed. The man who prides himself most on the novelty of his machine processes prides himself also on his conservatism in economics, sociology, politics and religion. This seeming paradox is to be explained by the fact that business men perceive most quickly when the proposals they consider can be expressed or realized in money terms. Improvements in machine technique offer immediate financial gains, improvements in such nonfinancial activities as sociology and religion seem to offer nothing but mental disturbance with no compensating advantages. It is because the five-day week, like the six-hour day, has not appeared to offer any financial gain to the employer that it has been so slow in winning adherents among employers of labor. The five-day week, like many other profitable changes in our production scheme, has been slow to make its gain felt. Instead of promising financial gain to the employer, it has seemed to promise immediate loss and the establishment of a dangerous precedent that would be certain to cause further loss in the future.

The extent to which the five-day week has been adopted by American business men is well indicated by the recent survey made by the Department of Labor. This disclosed a fact that will astonish many, namely, that approximately 200,000 workers, employed by 673 concerns, are now working on the five-day-week basis. The survey covered 77 different industries, 37,857 business establishments, and many hundreds of thousands of workers of whom no less than 5½ per cent. were working on a five-day-week schedule.

As an expedient for relieving the unemployment situation, the five-day week made a strong appeal to many business men, and this feature of the plan is undoubtedly responsible for its adoption by many concerns which, under better business conditions, might not have been willing to make the experiment. However, we learn many things of advantage in what might be called accidental ways. Like many of our great inventions, the gains derived from the adoption of some new idea come largely, if not entirely, as by-products. They have not been the end sought and, in that sense, their discovery has been accidental. It is more than likely that many of the concerns who have adopted the five-day week, out of what must be recognized as altruistic motives, will continue to operate on the shorter week after discovering its advantages as measured by pecuniary standards. On this point the survey provides illuminating evidence, for of all the concerns now operating on the five-day-week schedule, 2½ per cent. have adopted it as a permanent plan of work—permanent in the sense that there will be no return to the longer week. One of these concerns employs more than 100,000 workers, to whom the added day of leisure will provide additional opportunity for relaxation, for study, for amusement, and for recuperation. The value of these employee gains to the employer have proved to be as astonishing as they are real. The employer who has adopted the five-day week has derived from it all the advantages that accrued to him from the adoption of shorter working hours, rest periods, scientific feeding, proper light and ventilation, and the other improvements that have become necessities in an age of production enlightenment.

One of the chief reasons for labor's opposition to the introduction of labor-saving machinery has been the fact that the gains derived from its use have not been passed on, either to labor or to the consumer, but have been absorbed by the employer in the form of enhanced profit. Many modern employers, however, are now passing on to their workers large portions of this economy, sometimes in the form of higher basic wages, more rarely in the form of shorter working periods. While both methods seem to offer the worker the same advantages, the shortening of the working period is the only one which actually reduces the amount of labor he performs from week to week. Increased earning power may enable him to afford greater leisure late in life, but to many workers this "late-in-life" period never comes. The five-day week and the six-hour day make smaller demands on the physical powers of the workers and, so, are considered by them as offering more gain in terms of labor economy than higher wages. They have the further advantage, considered from the social point of view, of spreading a given amount of work among a larger number of workers and, thus, distribute the earnings of industrial effort over a wider section of the populace. Buying power is thereby rendered more stable inasmuch as there is a tendency to level the peaks and valleys of affluence and poverty. A more uniform distribution of buying power will be reflected immediately in an increased consumption by the many of commodities of general utility and in a decrease in the purchase by the few of luxuries and investments. The tendency will be to raise the average standard of living and, as has been said, the average rate of consumption, without depriving the employing group of any of the means essential to their own living or to the proper expansion of production facilities.

The man or woman who is employed during long hours and for a full week may earn relatively high wages, but there is little leisure in which to spend increased earnings or to enjoy the comforts which they will buy. The worker whose time is fully employed naturally becomes a saver, even a hoarder, and this will account for the fact that in past years men fully employed at lower wages have been able

to save more than their successors less fully employed at higher wages. The shortening of the working day has been one of the most important factors in raising our standard of living, because it has provided the leisure and, with it, the desire to enjoy the additional comforts and conveniences which added earning power have made possible. The shorter week and the shorter day offer much more than expedients for relieving present conditions; they promise immediate gains in increased production and more remote gains in increased consumption on the part of the workers to whom these advantages are extended. There is small wonder, therefore, that employers who have experimented with the plan have decided to follow it permanently.

## *The Gasoline-Tax Problem*

IN spite of the protests of motor-vehicle owners, road-builders and others interested in seeing that gasoline taxes are applied to the purposes for which they have been levied, there is still great danger that the funds derived from them will be largely diverted to other uses. In many places politicians are still determined to use the funds intended for road-building and road improvement in other ways which can be of greater utility to them politically.

Every one knows that the cost of building and improving our modern types of highways has been enormous and it was because of this fact that legislatures enacted gasoline-tax legislation which was designed to place the burden of such construction and improvement on those who were held to be the chief beneficiaries. Although motor-vehicle owners have not always, perhaps, agreed with the principle underlying the gasoline tax—believing that highways are of great benefit to others than those who make direct use of them—they have supported it and have even accepted higher rates than those at first applied in their confidence that the taxes so obtained would be applied to the purposes for which they were expressly levied. This was not only a normal expectation; it was a promise expressly stated in the laws making gasoline taxes effective. If the present prospect of the diversion of these tax funds to other purposes had been provided for by the laws making such funds available, or if motor-vehicle owners had even suspected that the money which they so cheerfully and generously contributed toward highway betterment would be misappropriated by diversion to other uses, they would have opposed with all their power the enactment of laws which would have sought to penalize them for the use of the highways without, in some cases, even assuring them that the funds collected would be expended to repair the ravages of such use.

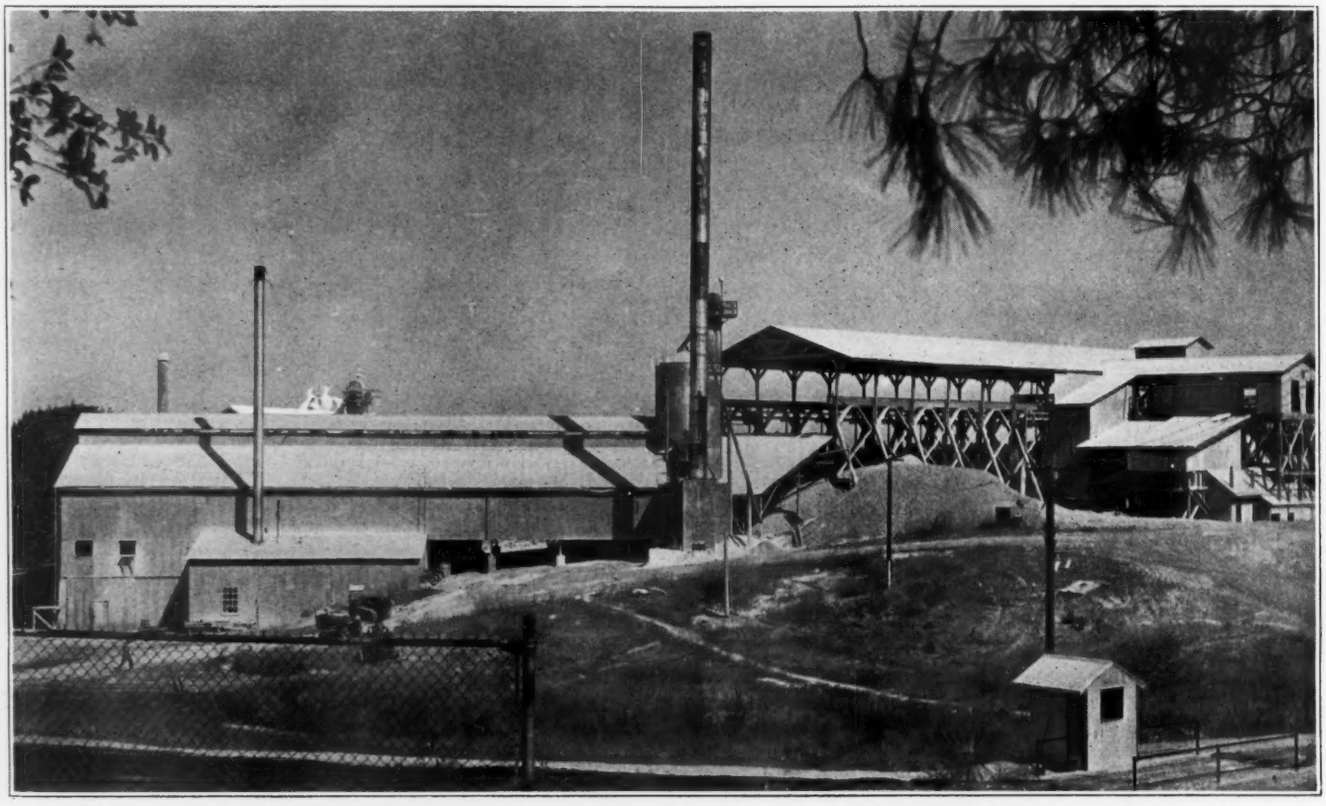
If legislators persist in their attempts to misapply gasoline taxes to other uses than the building and upkeep of roads, they must not be astonished if motor-vehicle owners use the great power of their numbers and their organizations to reduce or even to abolish those taxes. Owners will come to feel not only, as other classes of taxpayers already feel, that taxes are too high, but also that it is folly to tax the use of certain public facilities and then misappropriate the funds by expending them on activities that have no connection with such use. Motor-vehicle owners have paid huge sums for the building of new roads and the maintenance of old ones and they will never consent to the robbing of the gasoline-tax funds of their states in order to provide money for purposes in which they are not interested and for which their taxes were not collected.

What is more, road-building must be kept up to meet the needs of continuously growing traffic and, as there seems to be an increasing desire on the part of some legislators to retard the progress of road improvement, road betterment is not keeping pace with road-traffic development. If gasoline taxes are to be diverted to non-highway uses, this situation will become even worse than it is, and the coming years will be required not only to support the highway improvement made necessary by the traffic growth of those years but to make good the deficiencies and neglect brought about in the present period by the relative indifference to present highway needs and by the increasing desire to support other forms of state activity by the funds provided for road-building.

There are other reasons, aside from the legal and ethical ones, why gasoline taxes should not be used in ways not provided for in the laws which produced them. A large portion of the money spent in road work reaches the pocket of the so-called ultimate consumer, that section of the population on whose prosperity depends so largely the prosperity of the country as a whole. It has been estimated that between 80 and 90 per cent. of the money spent on highway construction and maintenance is distributed in the form of wages, one estimate—that of Thomas H. MacDonald, chief of the United States Bureau of Public Roads—placing the amount as high as 91 per cent. The motor-vehicle industry, which has grown to huge proportions largely because of the progress made in the provision and upkeep of modern highways, is a great beneficiary of road work. Any curtailment of that industry, resulting from the neglect to provide new and to maintain old roads on a scale commensurate with the needs of motor-vehicle traffic, will immediately affect the earning power of millions of men who, directly and indirectly, contribute to the making and servicing of motors and their equipment.

The fight for conserving gasoline taxes for road-building purposes belongs to other groups as well as to the motor-owning section of the population. The contracting group, those who provide the raw materials of which roads are made, the producers of motor-vehicle fuels, and the makers of the mechanical equipment used by these groups are vitally concerned in the road work of the country and should for that reason, if for no other, protest strongly against any curtailment of road-building activities by means of gasoline-tax diversion. The highway system of the country is of great importance to all these groups, not alone because of their direct share in its development through the sale of materials and services, but also because of the incalculable importance of modern highways in the prosperity of the entire country.

# Rotary-Kiln Lime Plant Gets Raw Stone Over Tramway Three Miles Long



View of Diamond Springs Lime Co. plant at Diamond Springs, Cal., with kiln building at left, stone-crushing and storage at right and truck scale in foreground.

## Closely-Controlled Operations Featured by Air-Separation of Pulverized Product

By W. E. TRAUFFER

ONE of the most interesting lime plants in the country is that of the Diamond Springs Lime Co. at Diamond Springs, Cal. It is a large and efficient rotary-kiln operation which produces a large variety of products and has many noteworthy and original features. Among these is the use of a 3-mi. aërial tramway to transport the raw stone from the quarry to the plant. The diversity of products, close control of operations, and the cleanliness of the plant are other features. Air-separation is used for final sizing of all the pulverized lime produced. The first car-load of lime was shipped from this plant on Dec. 11, 1928, and it has been in almost continuous operation since that time. The plant capacity is limited by the kiln capacity of 4 tons per hr. Double this capacity is attained when the second kiln is used.

A large variety of materials is produced at this plant. The raw limestone is used for road work, sugar-refining, steel-mill flux, concrete construction, and other purposes. The quicklime is used for construction work, orchard sprays, and mine-flotation work. The hydrated lime is used for agriculture, stucco, white-washing, orchard spraying, mine flotation, sugar flotation, cement admixing, water treatment, steel manufacture, etc.

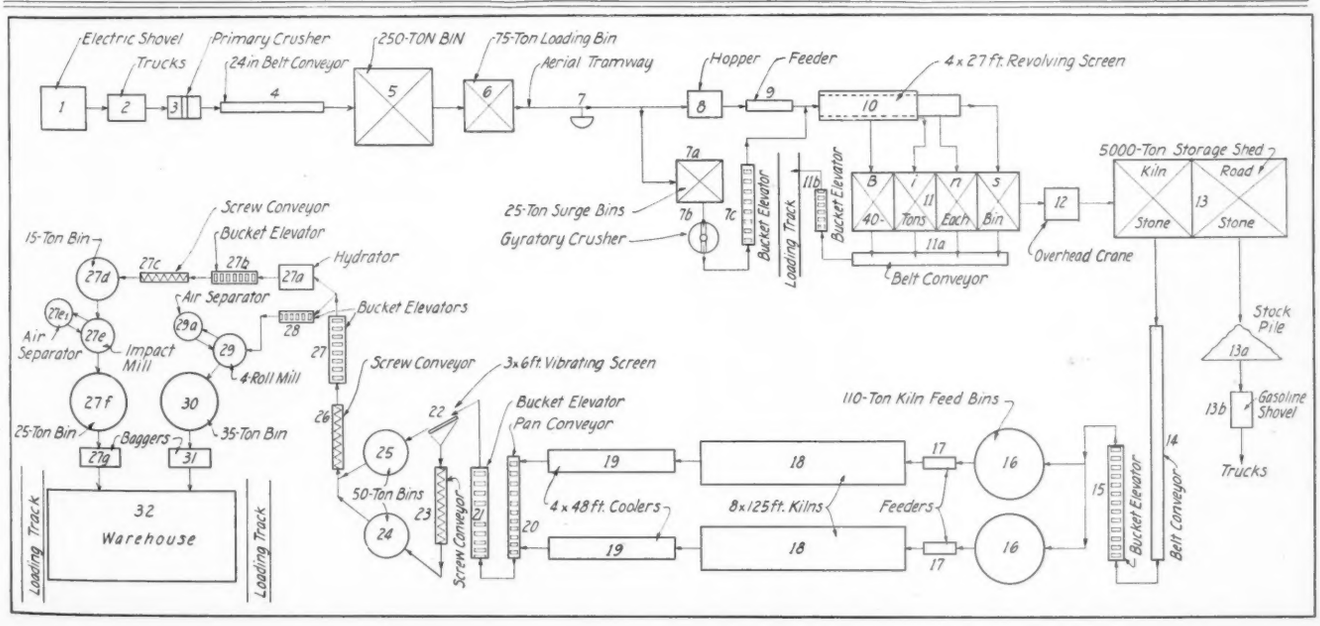
The deposit of limestone furnishing raw materials to the plant is well suited to the diversity of products. The stone varies from a dolomite to a high-calcium limestone. The magnesia content varies from as high as 26 per cent. to as low as 1 per cent.

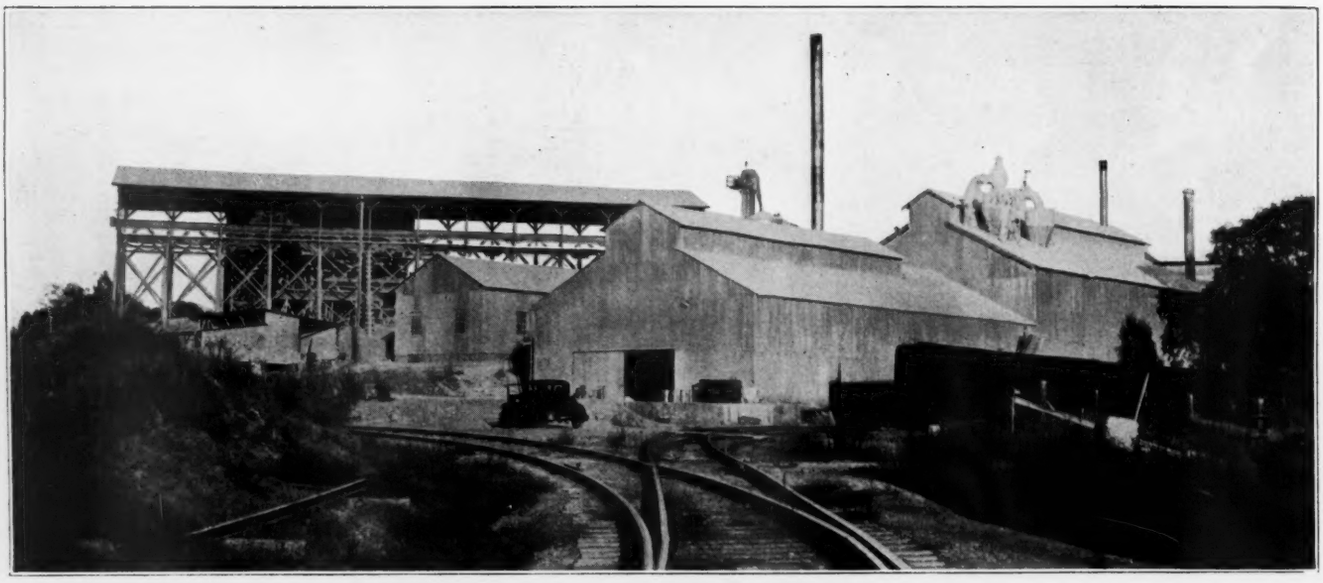
The plant is located on the outskirts of the town of Diamond Springs, Cal., which is 46 mi. east of Sacramento and 3 mi. south of Placerville. This region is of great historic interest as gold was first discovered in California in 1848 at Coloma, on the South Fork of American River only 17 mi. from Diamond Springs. The country for many miles around was at one time dotted with gold operations, only a few of which are now actively worked. Placerville, a quiet town of 2,300 inhabitants, was in earlier days known as Hangtown. This name was quite appropriate, as it was once the seat of justice for the gold-mining region and the justice meted out to offenders was quite sudden and effective.

The quarry is located about 3 mi. east of the plant. The limestone deposit is stratified with re-

**TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF DIAMOND SPRINGS LIME CO. PLANT AT DIAMOND SPRINGS, CAL**
*(The key numbers refer to the equipment shown on the accompanying flow-sheet.)*

| Operation | Key | Equipment | Make | Model No., Size, Capacity or Type | Power Source | Power Transmission |
|---|---|---|---|---|---|---|
| Raw-material recovery and transportation | 1 | Shovel | Link-Belt | 1¼-cu. yd. electric | 60-hp. G. E. | Link-Belt silent-chain. |
| | 2 | Trucks (2) | International | 5-ton | | |
| Primary crushing | 3 | Primary crusher | Allis-Chalmers | 40-in. by 42-in. jaw | 150-hp. G. E. slip-ring | Belt |
| | 4 | Belt-conveyor | Stearns | 24-in. by 180-ft. | 15-hp. G. E. | Belt |
| | 5 | Bin | | 250-ton | | |
| | 6 | Loading bin | | 75-ton | | |
| Transportation | 7 | Aerial tramway (Optional to 7a) | Am. Steel & Wire Co. | 50-ton per hr. | 40-hp. Westinghouse induction | Belt |
| | 8 | Hopper | | | | |
| | 9 | Feeder | Link-Belt | Reciprocating type | 5-hp. Westinghouse | Link-Belt silent-chain |
| Screening and storage | 10 | Revolving screen | Link-Belt | 4-ft. by 27-ft. | 15-hp. Westinghouse | Link-Belt silent-chain |
| | 11 | Bins (4) (Optional to Car-loading 11a) | | 40-ton each | | |
| Recrushing | 7a | Surge-bin | | 25-ton | | |
| | 7b | Reduction crusher | Telsmith | 8-in. gyratory | 50-hp. Westinghouse | Belt |
| | 7c | Bucket-elevator (To Screening and storage 10) | Link-Belt | | | |
| Car-loading | 11a | Belt-conveyor | Link-Belt | 36-in. by 250-ft. | 10-hp. Westinghouse | Link-Belt silent-chain |
| | 11b | Bucket-elevator | Link-Belt | | | |
| Storage | 12 | Overhead crane | Judson Pacific Co. | 1½-cu. yd. | 2 50-hp., 1 15-hp., 1 5-hp. | Gears |
| | 13 | Open storage (Optional to stock-piling 13a) | | 5,000-ton | | |
| Stock-piling | 13a | Stock-piles | | | | |
| | 13b | Shovel | Northwest | ¾-cu. yd. gasoline | | |
| Reclaiming | 14 | Belt-conveyor | Link-Belt | 24-in. by 40-ft. | | |
| | 15 | Bucket-elevator | Link-Belt | 67-ft. | 10-hp. | Link-Belt silent-chain |
| | 16 | Kiln-feed bins (2) | Link-Belt | 110-ton circular | | |
| | 17 | Feeders (2) | Link-Belt | Belt-type | Kiln drive | Chain and Reeves variable speed transmission |
| Calcining | 18 | Kilns (2) | Vulcan | 8-ft. by 125-ft. | 25-hp. variable-speed | Link-Belt reducer and gears |
| | 19 | Coolers (2) | Vulcan | 4-ft. by 48-ft. | 15-hp. Westinghouse | Belt and gear |
| | 20 | Pan-conveyor | Link-Belt | | 5-hp. Westinghouse | Chain and gear reducer |
| | 21 | Bucket-elevator (Optional to Quicklime screening and storage 23) | Link-Belt | 60-ft. | 7½-hp. Westinghouse | Link-Belt silent-chain |
| Quicklime screening and storage | 22 | Vibrating screen (Oversize to 25, throughs to 23) | Link-Belt | 3-ft. by 6-ft. single-deck | 2-hp. Westinghouse | Belt |
| | 23 | Screw-conveyor | Link-Belt | | 5-hp. Westinghouse | Link-Belt reducer and silent chain |
| | 24 | Bin | Link-Belt | 50-ton capacity | | |
| | 25 | Bin | Link-Belt | 50-ton capacity | | |
| | 26 | Screw-conveyor | Link-Belt | | | |
| | 27 | Bucket-elevator | Link-Belt | | | |
| | 28 | (Optional to hydrating 27a) Bucket-elevator | Link-Belt | 40-ft. | 5-hp. Westinghouse | Link-Belt silent-chain |
| Quicklime Pulverizing and packing | 29 | 4-roller mill | Raymond | 4-roller | 50-hp. Westinghouse | Belt |
| | 29a | Air-separator | Raymond | No. 11 Exhauster | 40-hp. Westinghouse | Belt |
| | 30 | Bin | Link-Belt | 35-ton capacity | | Belt |
| | 31 | Bagger (To storage for shipment 32) | Valve Bag Co. | 4-bag | 7½-hp. Westinghouse | |
| Hydrating | 27a | Hydrator | McGann-Schulthess | 6-t.p.h. capacity | 15-hp. G. E. | Famous worm reducer and gear |
| | 27b | Bucket-elevator | Link-Belt | 40-ft. | 7½-hp. Westinghouse | |
| | 27c | Screw-conveyor | Link-Belt | | | |
| | 27d | Bin | Link-Belt | 15-ton capacity | | |
| Hydrated-lime grinding and packing | 27e | Impact mill | Raymond | | 20-hp. Westinghouse | |
| | 27e | Air-separator | Raymond | No. 12 Exhauster | 50-hp. Westinghouse | Direct-connected |
| | 27f | Bin | Link-Belt | 25-ton capacity | | |
| | 27g | Bagger (To storage for shipment 32) | Valve Bag Co. | 4-bag | 7½-hp. Westinghouse | Belt |
| Storage for shipment | 32 | Warehouse | | 50-ft. by 90-ft. | | |



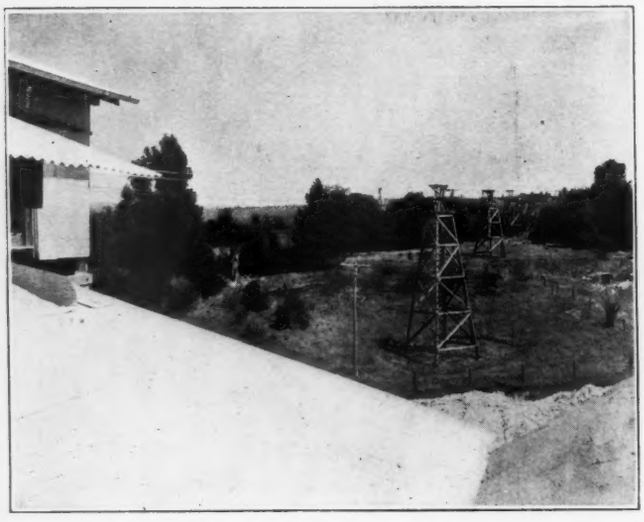


Left to right: stone storage, warehouse, and hydrator building.

spect to its chemical analysis. Its extent is almost unlimited but is most economically accessible at the point where operations are now being conducted. The company owns a large acreage of the deposit, which varies from 400 to 800 ft. in width, and tests have shown the presence of good rock to a depth of 600 feet. The entire property has been core-drilled and analyzed so that the desired type of stone can be selected at any time.

The open quarry is being worked back into the deposit and now has a 45-ft. face which will increase in height as operations are extended. The overburden of clay averages 8 ft. in depth and is removed during slack seasons by the same shovel used for loading rock in the quarry. The refuse stone from the stripping operations is loaded out and sold for road stone.

Drilling is done with Ingersoll-Rand X71 Jackhamers using 36-ft. steel 1¼ in. in diameter. As the height of the face is beyond the limit of these drills Jackhamers on tripods drill in below to meet the vertical holes. The vertical holes are drilled in staggered double rows with 10-ft. spacing.



Plant end of the 3-mile-long aërial tramway.

Trojan 40-per cent. bag powder is used and is detonated by a battery or from the 440-v. plant circuit. About 25,000 tons of rock are shot down at one time, the results averaging 4½ tons to 1 lb. of powder. Some secondary blasting is necessary.

The rock is loaded by a Link-Belt 1¼-cu.yd. electric shovel into two 5-ton International trucks.

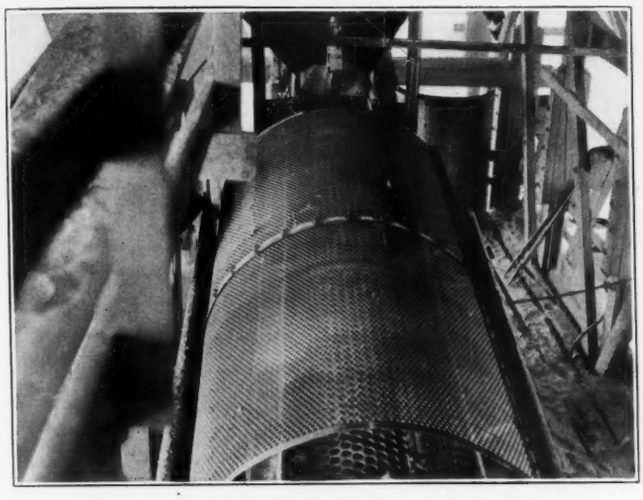
The tramway from the quarry to the plant showing clearing made through timber.

These now haul a distance of about 300 ft. to the crusher building, where they discharge directly into the 40-in. by 42-in. Allis-Chalmers primary jaw crusher which has a 7-in. opening. This discharges to a 24-in. inclined belt-conveyor which operates on 180-ft. centers and discharges to a 250-ton bin in the loading-terminal building. This bin discharges by gravity into a 75-ton loading bin which feeds the tramway cars. The crusher is belt-driven by a 150-hp. G. E. slip-ring motor. Both crusher and motor are on concrete foundations.

A machine and blacksmith shop near the quarry contains an Ingersoll-Rand drill sharpener, a forge, and other necessary equipment. A Sullivan Class WJ 18-in. by 11-in. by 14-in. air-compressor furnishes air for the drills and is belt-driven by a 100-hp. Westinghouse motor. The quarry office is also

located in this building. The crusher and loading-terminal buildings are of timber with concrete foundations and are inclosed with corrugated metal.

The continuous tramway connecting the quarry to the plant is supported on 83 timber towers and has 149 buckets with a capacity of 1,000 lb. each. Interlocking cable is used on both track lines, 1⅛-in. on the loaded line and 1-in. on the return line. The pull line is ⅝-in. Lang-lay cable. Tension for the two track lines is taken up at a point halfway between the terminals, while that of the pull line is taken up at the discharge end. A mechanical air-pressure oiler, kept at the loading terminal, travels along the tramway at regular intervals to keep the



Revolving screen and feeder in crusher building.

lines well lubricated. There is also an inspection car in which regular trips are made.

The tramway has a rated capacity of 50 tons per hr. and is driven at the loading terminal by a 40-hp. Westinghouse induction motor. As this terminal is 198 ft. higher than the unloading terminal at the plant this motor is amply large to start up the tramway either when empty or when under load. When in operation only 5 hp. is actually required.

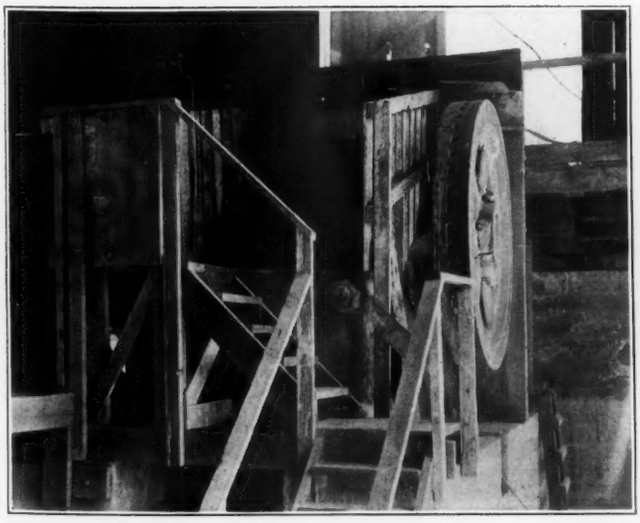
At the loading terminal empty cars are shunted

Overhead crane and bucket rehandling rock in storage.

to a steel-rail trolley siding, where they are kept until ready to be loaded. They are then pushed by hand to the loading bin, where they are loaded through any of the three Stephens-Adamson lever-operated cut-off gates. The loaded cars are then pushed back on the cableway.

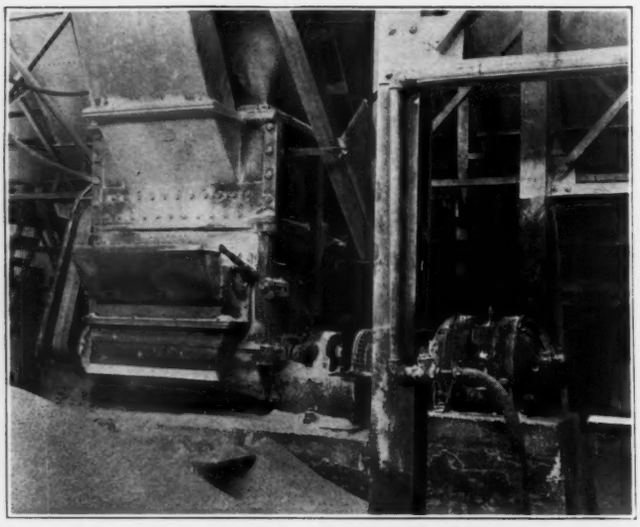
On arrival at the plant the cars are shunted to another trolley siding and are dumped by hand at one of two unloading points, one for commercial rock and the other for use when kiln rock is being handled.

When commercial rock is being produced the cars are dumped to a small hopper with a Link-Belt reciprocating feeder which leads it to a 4-ft. by 27-ft. revolving screen of the same make. This has 1½-in. perforations on the main barrel, ¾-in. on the outer jacket, and 5-in. on the overhang. The stone over 1½-in. in size is used for sugar rock when this material is in demand. Otherwise the screen feeds to an 8-in. Telsmith gyratory reduction crusher which reduces the material to 2¼-in. and under and feeds by elevator and chute back to the screen. The ¾-in.-to-1½-in. stone is used for kiln feed and that from ¾-in. down for road rock. The various



Primary jaw-crusher at the quarry.

Shovel loading to truck in quarry.



The impact pulverizer and its drive.

sizes are chuted direct to four 40-ton concrete bins.

When kiln stone only is desired the cars are dumped to a 25-ton surge-bin which feeds direct to the gyratory crusher. The crusher product then feeds by elevator to the screens and then goes in the same manner to storage.

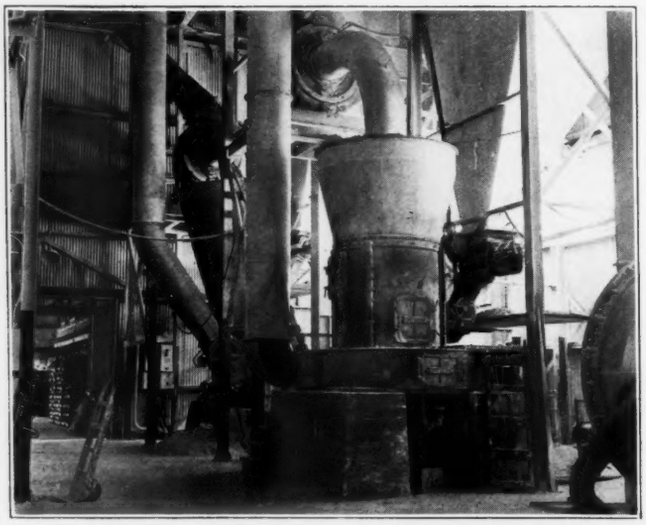
A Judson Pacific Co. 5-ton overhead traveling crane, fitted with a 1½-cu.yd. Brownhoist clam-shell bucket, handles these materials to an open storage-shed, 40 ft. wide by 200 ft. long, which has storage capacity for 2,000 tons of kiln stone and 3,000 tons of road stone. A concrete tunnel under the 4 concrete bins houses a 36-in. by 250-ft. reclaiming belt-conveyor which discharges by means of an elevator directly into cars on a siding alongside the plant. Another tunnel conveyor, under the kiln-stone side of the open storage, feeds the lime-burning building. During the winter season, when demand drops off to some extent, excess prepared stone is stored in stock-piles near the plant. A ¾-cu.yd. Northwest gasoline shovel rehandles either for shipment or back to the plant flow.

The tunnel conveyor feeding from storage to the lime plant discharges to a steel-inclosed chain-bucket elevator on 67-ft. centers which feeds either

Tramway bucket in loading position beneath the chutes in the quarry building.

of two 110-ton circular steel kiln-feed bins. Only one of these bins is now in use as only one of the kilns is in operation. The bin discharges through a spout which has a spring adjustment to control the rate of feed to a Link-Belt belt-feeder. This in turn discharges, through a 12-in. special heat-resisting pipe, into the kiln. This pipe metal, known as "Calocast," is made by the Stockton Iron Works. The feeder is driven through a Reeves variable-speed transmission by a chain from the kiln drive.

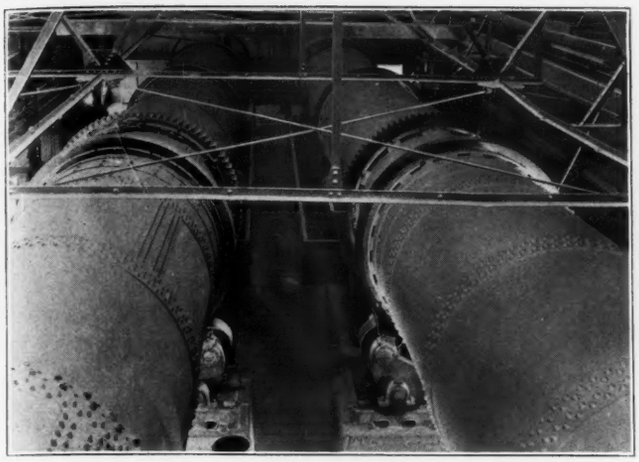
Each of the two 8-ft. by 125-ft. Vulcan rotary kilns is driven by a 25-hp. motor through a Link-Belt herringbone speed-reducer and gears. The kilns are inclined ½ in. to the foot and are driven at speeds varying from 1/6 to ½ r.p.m. Spring-



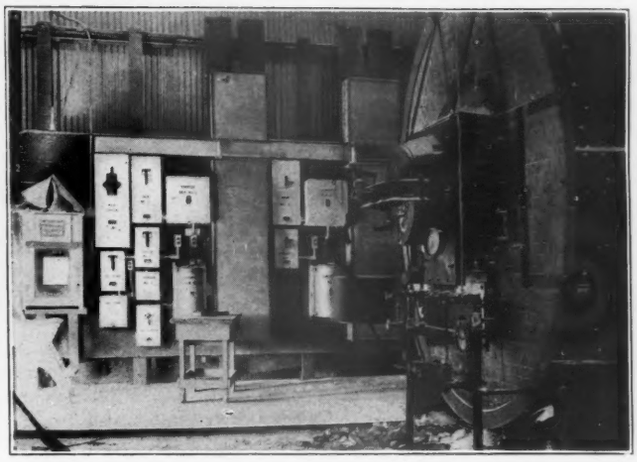
The two grinding mills with air-separation systems.

expansion-type seal rings of the company's own make are used to seal the feed end of the kilns where they meet the 6-ft. by 64-ft. by 14-ft. flue chamber. This chamber has a 4-ft. steel stack 102 ft. high. Sealed openings at the end of the chamber provide for possible future utilization of $CO_2$ gas. Stockton Fire Brick Co. Carnegie liner is used in the hot zones of the kilns and regular liner of the same make in the remainder.

Bucket at one of the discharge points in crushing-and-screening building.

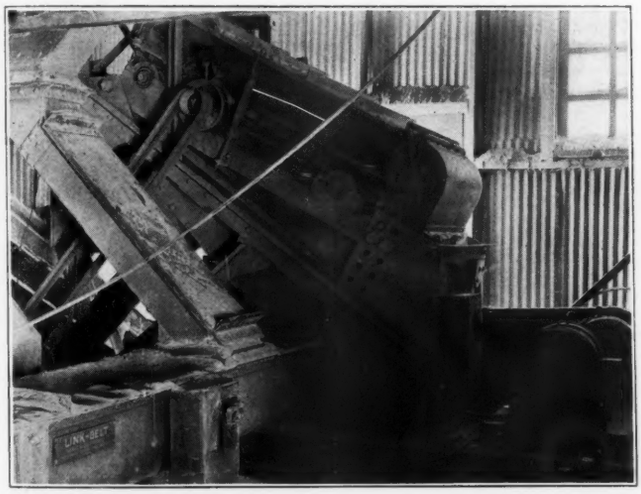


Looking down on the two kilns from the feed ends.



Kiln-control board and firing end of one kiln.

The kilns are oil-fired through remodelled Coen-type burners, which have micrometer-adjustment feed valves to insure accurate control. They feed the oil to the kiln at a temperature of 280 deg. F. and a pressure of 225 lb. A Thwing temperature-recording pyrometer records the heat at both ends of the kiln. Kiln temperatures vary from 1,800 to 2,200 deg. F. at the firing end of the kiln, depending on the type of stone being calcined. At an average temperature of 2,000 deg. F. at the firing end the temperature at the feed end of the kiln varies from 1,260 to 1,300 deg. F.

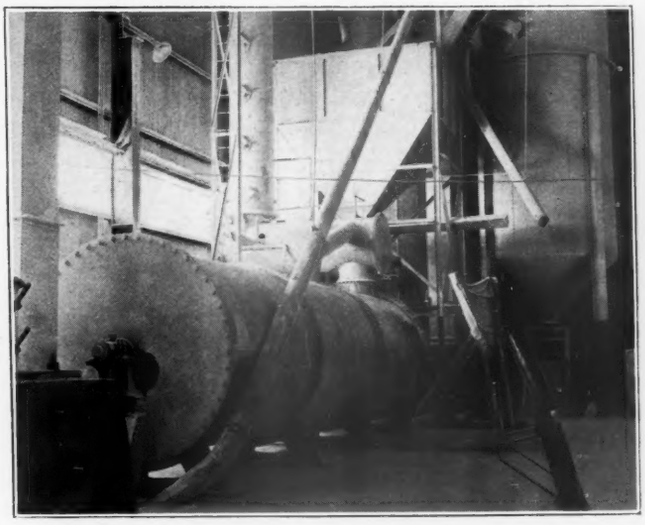


The inclosed vibrating-screen and screen-conveyor in the hydrator building.

The kilns discharge to two 4-ft. by 48-ft. Vulcan rotary coolers located underneath the kilns and feeding in the opposite direction. Each is belt- and gear-driven by a Westinghouse motor. The coolers have a 30-in by 50-ft. metal stack pulling a draft through them, and also special quadrant chambers of the company's own design which break the line into four separate streams and allow more efficient cooling. This system is so efficient that the lime discharged from the coolers can be picked up in the bare hand.

The coolers discharge to a pan-conveyor which is set at right angles to them and leads to a steel-inclosed bucket-elevator having overlapping buckets. This feeds to the top of the hydrator building into an inclosed 3-ft. by 6-ft. Link-Belt single-deck vibrating screen. This has $\frac{5}{8}$-in. California wire cloth. The oversize ($\frac{1}{2}$-in. to $1\frac{1}{2}$-in.) drops through a chute into a 50-ton circular steel bin for quicklime. The fines ($\frac{1}{2}$-in. minus) go to a screw-conveyor which supplies a second 50-ton bin for hydrating lime. If desired, the elevator can by-pass the screen and discharge directly to this screw-conveyor.

Another screw-conveyor takes the material from either one of or both the bins, as desired, and discharges to a steel-inclosed bucket-elevator. This can discharge through any one of three steel chutes: one for loading bulk lime directly into trucks; another for discharge to a steel hopper feeding a McGann Schulthess continuous hydrator; and a third to be described later. Some changes have been made in the hydrator to make it conform to the type of material used and it now has a capacity of 6 tons per hr. The hydrated lime is discharged to a bucket-elevator, which takes it to a screw-conveyor that discharges into a 15-ton mill-feed bin. This supplies a No. 3 Raymond impact pulverizer which is provided with an air-separation system in closed circuit. This unit grinds to a fineness of $99\frac{3}{4}$ per



The continuous hydrator with feed bins and elevator in background.

cent. passing 300-mesh or 97 per cent. on 400-mesh. The finished hydrate is discharged to a 25-ton steel bin which supplies a 4-tube Valve Bag packer.

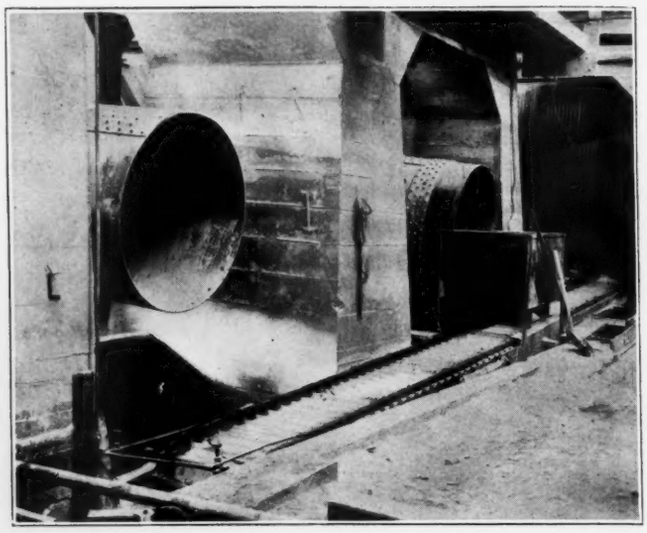
A by-pass above this bagger bin allows the hydrate to be recirculated through the roller-mill but this system is no longer used.

The rejects from the impact mill can be discharged to a bucket-elevator which feeds the roller-mill when agricultural lime is produced. The changes made in the hydrator, however, have made it so efficient that this is now unnecessary and is no longer used. The small amount of rejects now produced is discharged to a pile alongside the impact mill from which it is rehandled by hand.

Interior of the storage building. Door in center leads to room containing hydrator, mills, and packers.

The third chute mentioned above discharges the quicklime to a bucket-elevator which supplies a feed bin over a Raymond high-side 4-roller mill. A 12-in. by 24-in. Raymond rotary feeder which has a capacity of 5 tons per hr. controls the rate of feed to the mill, and grinds to 98 per cent. passing 100-mesh. This also has an air-separation system in closed circuit. The finished quicklime is discharged to a 35-ton steel bin over a second 4-tube Valve Bag packer. Over 90 per cent. of the quicklime is now shipped in pulverized form in paper bags. Howe platform scales are used for checking sack weights. shipped in pulverized paper bags. Howe platform scales are used for checking sack weights.

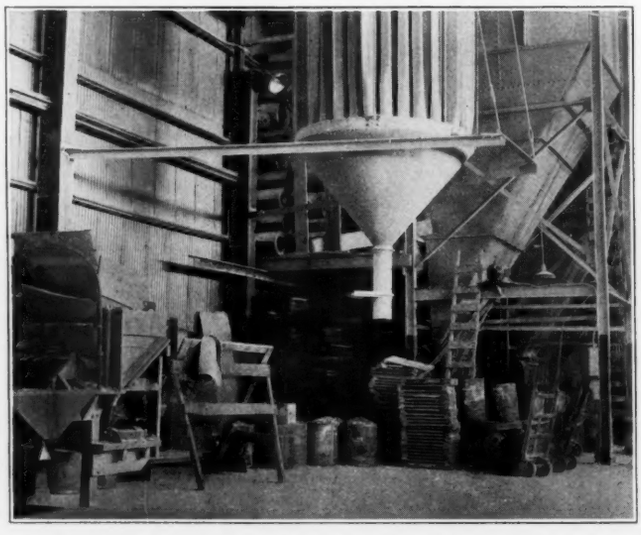
The finished product is trucked by hand either direct to cars or trucks for shipment or into the warehouse adjoining the processing building for storage. The warehouse is 50 ft. wide by 90 ft. long and is of steel-frame construction with corrugated-metal siding and roofing. Empty boxes and bags are stored on a mezzanine floor at the near end of the building. Shipments are loaded out on two loading tracks alongside the building and a truck platform at the end. The plant is connected by a ¼-mi. siding to the Sacramento-to-Placerville branch of the Southern Pacific Ry. Shipments are made to the major part of the territory west of the Rocky Mountains and some material is even shipped to the Philippine Islands and Central and South America. A 24-ton Howe truck-scale near the plant



Discharge of rotary coolers to pan-conveyor.

is used for weighing out road stone, agricultural lime and bulk lime.

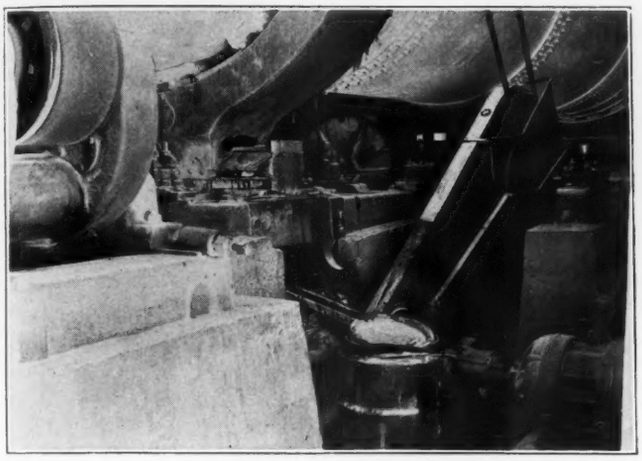
The 4-ft. by 7-ft. well, which supplies the water for plant operation and other purposes, is located almost ½ mi. from the plant. It is concreted to a depth of 50 ft. and has drifts which give adequate storage capacity to last through the dry seasons. Water is pumped by a 4-in. by 6-in. Deane Triplex pump to a 12,500-gal. tank at the plant. The ground pressure is 40 lb.



The two bag-packers with dust-collector in foreground.

Electricity is received from the wires of the Pacific Gas & Electric Co. which, to insure continuous service, has installed adjacent to the plant a modern outdoor-type, all-steel construction automatic substation which has two 60,000-kv. lines leading into it. Should voltage failure occur on the line feeding the plant the automatic time inverse relay separates the lines north and south and switches the plant to the line that is clear. This assures the operation of the plant with very slight interruption. The transformers at this station step the current down from 60,000 kv. to 11,000 kv. The 11,000-kv. line is run to the plant and the 3 mi. to the quarry, where it is stepped down again to 440 v. from the main switch-

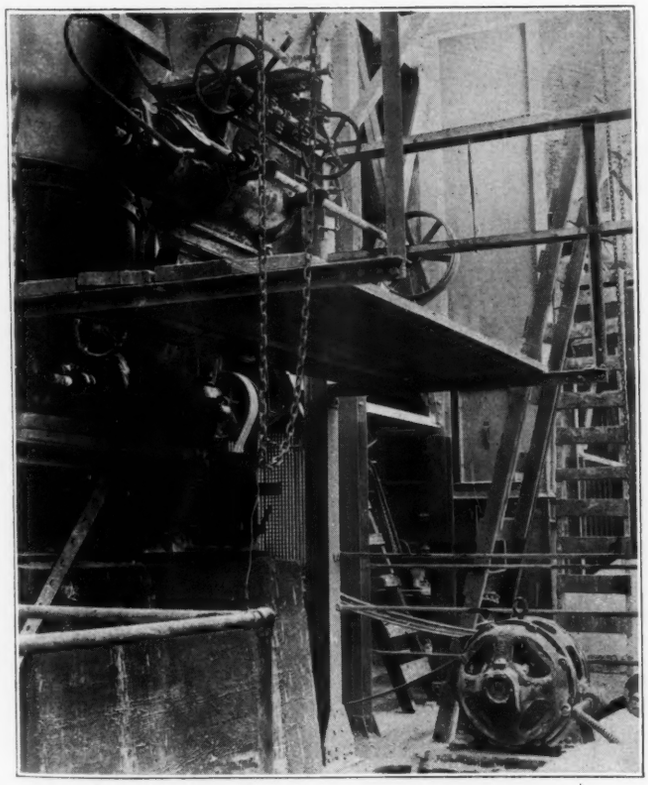
board at the plant transformer. Conduit is run under ground to separate switch-boards in each building. On these boards are mounted inclosed-type switches and remote-control push-button stations. All the motors on the unloading terminal are controlled from the unloading deck. All the kilns, coolers and kiln elevators and conveyors are controlled from a switch-board on the firing end of the kilns. The hydrator, Raymond mill and Raymond



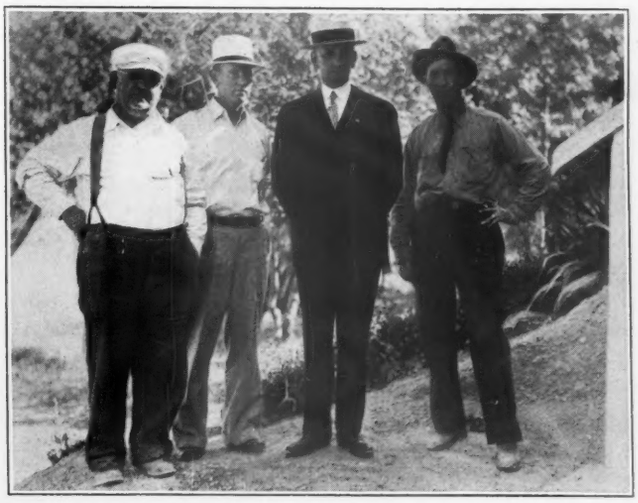
Speed-reducer drive of one of kilns. Chain drive of feeder at right.

impact pulverizer are remote-controlled from a switch-board alongside the hydrator, so that the man operating the hydrator has full control of all the operating machinery in the hydrator building, as this operator is the only one handling these machines.

The fuel-oil kiln-firing system now in use is the result of considerable research and experimentation.



The roller-mill showing feeder and mill drives.



Left to right: R. J. Finchley, plant superintendent; G. W. Johnson, chief chemist; H. P. Brown, president and general manager; and J. Nickless, quarry superintendent.

Oil with a specific gravity of from 11 to 14 is used. This is received in tank-cars which discharge by gravity to a 30,000-gal. steel storage-tank. Oil is pumped from this tank to a 600-gal. tank at the plant by a Fairbanks-Morse 3-in. by 3-in. oil-immersed piston pump and a Deane 2-in. by 3-in. Triplex pump, both Link-Belt silent-chain-driven. Before entering the pumps the oil is heated by an immersion type Wesix electric heater. From the 600-gal. tank at the plant the oil passes through a steam-jacketed oil-heater to a reciprocating steam pump which pumps the oil to 225-lb. pressure on the discharge line of the steam pump. The oil passes through a steam-jacketed return tubular oil-heater, where the oil temperature of 280 deg. F. is maintained. A 100-hp. oil-fired boiler supplies steam for heating, pumping and atomizing the oil. An average of 50 gal. of fuel oil is required to produce 1 ton of lime. Various tests have shown that the kiln is fired at 85 per cent. efficiency.

All operations are checked in the chemical laboratory, which is in a stucco building near the plant office. It is completely equipped with a vacuum drier, ovens, stills, scales, and other equipment. Raw materials are regularly tested to determine their suitability for different products. Each run of hydrated or quicklime is analyzed and a monthly composite of the results obtained is made. This close check on all operations makes it possible for the company to produce a lime which will accurately meet the requirements of the user.

A small building near the plant is provided for the convenience of contractors, architects, etc., wishing to make tests of the company's products. Mixing boards and other equipment allow tests to be made under actual conditions. Another building near the plant houses a completely-equipped machine and blacksmith shop, where all plant machinery and electrical repairs are made. Some of the plant equipment is made there. This building also houses the plant compressors.

The plant was designed by the Smith-Emery Co. The Link-Belt Co. furnished all the steel bins, feeders, bucket-elevators and screw-conveyors, and

all the belt-conveyors except the one of Stearns manufacture at the quarry. Goodrich conveyor belting is used exclusively. With a few exceptions, all the electrical equipment and motors were furnished by the Westinghouse Electric & Mfg. Co. All the buildings are inclosed with American Sheet & Tin Plate Co. "Apollo" corrugated-metal siding.

With a few exceptions, all plant buildings are of structural steel with corrugated-metal siding and roofing. All foundations are of concrete resting on bed rock. The loading building at the quarry and the crusher building and craneway at the plant are of timber construction to give them enough resilience to divert any shocks in the cableway without damage.

When operations are in full swing 22 men are required at the plant and 8 at the quarry during the day shift. The quarry and tramway supply sufficient material in an 8-hr. day to keep the lime plant running 24 hr. Only 3 men are required at night for running the kilns and all other machinery except the hydrator.

The labor turn-over in the 3 yr. the plant has been in operation has been confined to one man, a night watchman who retired because of old age. This loyalty of the employees is largely due to the measures taken by the company to insure their comfort and to the fact that the wage scales have always been high enough to afford a comfortable living.

The company also has a side-line which promises to become an important one. When the plant was erected it was decided to paint all the machinery with an aluminum finish with the double purpose of protecting the metal and improving the appearance of the plant. In carrying out this program, however, it was found that none of the paints on the market at that time had sufficient heat-resisting properties to enable them to adhere to the kilns and stacks. The chemistry department then went to work on this problem and succeeded in producing a paint suitable for this purpose. The original coat of this paint has now withstood kiln and stack temperatures and the natural elements for almost 3-yr. with no signs of scaling or disintegration. The results were so satisfactory that a subsidiary, the El Dorado Chemical Co., was formed to manufacture this paint for the market. A base-coat paint and a thinner have also been developed.

The main office of the Diamond Springs Lime Co. is at the plant but a sales office is maintained in the Russ Bldg., San Francisco, Cal. The officers of the company are: H. P. Brown, president and general manager; Odell Wilson, vice-president; E. E. Fout, secretary, treasurer and sales manager. R. J. Finchley is plant superintendent, J. Nickless is quarry superintendent, and Geo. W. Johnson is chief chemist.

Mr. Brown is active in the management of the company and plant and makes his residence in Placerville. In spite of his many duties, however, he has time for other interests. Wild life is abundant in the timberland in the vicinity of the plant. During dry seasons food and water are scarce and hundreds of squirrels, wild canaries, quail, etc., come to the plant where food and water are kept for them. The squirrels are as tame as any found in city parks.

The summer of 1931 was unusually dry and late in July one of the forest fires, which are a constant menace in this part of the state, burned thousands of acres of timberland in and around Diamond Springs. This fire destroyed several of the aërial tramway towers but was prevented from reaching the plant by the paved highway which passes between the plant and the quarry. The quarry was shut down for several days while these towers were rebuilt, but there was no delay to plant operations as an ample supply of stone is always kept on hand.

## A. S. T. M. Committees Meet in Group Sessions at Cleveland

Committees of the American Society for Testing Materials held another in their series of annual spring group meetings in Cleveland at the Hotel Cleveland from March 7 to 11. This series of meetings, arranged for the convenience of committee members who are interested in the activities of more than one committee, was well attended. Committee sessions took place in the morning, afternoon and evening of each day, with the exception of Wednesday evening, when the Regional Meeting Dinner was held. About 400 registered for the meetings.

Several of the committees offered new standards and there were several revisions of existing ones suggested and acted upon. There were new sub-committees formed to investigate important projects and programs of work for these and existing groups were laid out.

The Cleveland Regional Meeting was the third held by the Society in conjunction with the Group Meetings of Committees. At the dinner in the evening a short address was given by Dr. F. O. Clements, technical director, General Motors' Research Laboratories, and president of the A.S.T.M.

## Standardization of Road-Building Materials Recommended

The Committee on Road and Paving Materials of the American Society for Testing Materials which met in Cleveland March 9 as part of the A.S.T.M. spring group meetings of committees there, March 7 to 11, recommended adoption as a tentative standard of the Method of Chemical Analysis of Calcium Chloride, published as information in an appendix to the 1931 report of the committee. It was also recommended that the tentative revisions of the five definitions for bituminous road materials, adopted at the last meeting, be accepted as standard. Work during the past year of the Subcommittee on Extraction of Bituminous Aggregates was considered to be of sufficient importance to be incorporated as an appendix to the 1932 annual report of the committee. It was also decided to recommend a revision of the Tentative Method of Test for Consistency of Portland-Cement Concrete (D 138-26T).

# Improvements in Production and Future Prospects for Hydraulic Lime

EXTRAORDINARY results may be expected by the application of super-burning and super-quenching to limestone, according to experiments, says a writer in *Revue des Materiaux de Construction*. Deep study and experiments for three years with different varieties of limestone of very different chemical composition and sometimes rather heterogeneous physical texture have fully confirmed expectations.

The results to be attained by this method can no longer be doubted and it may be said that, in general, it is possible to produce, by super-burning and super-quenching with most kinds of hydraulic limestone, resistances four to five times greater than the normal ones of 2 to 4 kg. usually obtained in trials with 1:3 mortar after 7 days.

When the chemical composition and physical texture of limestone are favorable for the formation of the compounds producing the resistance it may be expected to exceed 20 kg. per sq. c. after 7 days with plastic mortar 1:3.

In many experiments made with a fine quality of eminently hydraulic limestone, it was not unusual to have, after two days, resistances of 14 and 15 kg., and this is very remarkable. These figures are those obtained in semi-industrial trials and they can easily be demonstrated.

It may be said that these results somewhat upset the theories hitherto accepted as regards the value of the "index of hydraulicity" and other endeavors to class products by formulæ and numbers.

In support and confirmation of this assertion it may be well to observe that the city of Paris has, for more than a year, abandoned the indications given by the chemical composition of a product. Nothing but hardening and durability is taken into account, together with retention of form in boiling water. Fineness and apparent density themselves are only noted as supplemental data.

Some examples will explain better than any description what can be expected and obtained with this method of appreciating what becomes of the rules for classification of products according to their chemical composition. All these products retain their form in boiling water. The following analysis is of a material the resistances of which, after 7 and 28 days, was 18 and 24 kg. per c. c.:

| | |
|---|---|
| Silica | 14.30 per cent. |
| Iron and aluminum | 8.50 per cent. |
| Lime | 66.80 per cent. |
| Magnesia | 0.50 per cent. |
| Sulphuric anhydride | 0.70 per cent. |
| Loss in fire | 8.90 per cent. |

A product of different origin gave, after 7 days and 28 days, 19 and 26 kg.

Its chemical composition is:

| | |
|---|---|
| Silica | 17.50 per cent. |
| Iron and aluminum | 8.20 per cent. |
| Lime | 65.80 per cent. |
| Magnesia | traces |
| Sulphuric anhydride | 0.80 per cent. |
| Loss in fire | 7.70 per cent. |

Another different product gave, after 7 and 28 days, 20 and 27 kg. The chemical composition is:

| | |
|---|---|
| Silica | 15.00 per cent. |
| Iron and aluminum | 8.50 per cent. |
| Lime | 66.20 per cent. |
| Magnesia | 0.40 per cent. |
| Sulphuric anhydride | 0.60 per cent. |
| Loss in fire | 9.20 per cent. |

Thus the index of hydraulicity for such products hardly corresponds to any but averagely-hydraulic limes, yet their resistances are the same as those of good cements.

The percentages of these types of materials are rather low, rather great for iron and aluminum, when we consider the ratio $SiO^2$: $Al^2O^3 + Fe^2O^3$.

Here, however, are three other kinds of product wherein this ratio is rather high and the percentage of $SiO^2$ is rich. The resistances given by these products are remarkable.

| | A | B | C |
|---|---|---|---|
| Silica | 20.40% | 16.50% | 21.00% |
| Iron | 2.90% | 1.60% | 1.80% |
| Aluminum | 3.70% | 2.30% | 3.50% |
| Lime | 65.20% | 66.10% | 64.20% |
| Magnesia | 1.20% | 1.30% | 0.80% |
| Sulphuric anhydride | 0.80% | 1.50% | 1.20% |
| Loss in fire | 5.56% | 9.80% | 6.20% |

| | A | B | C |
|---|---|---|---|
| Tensile stress after 4 days.. (*kg.*) | 10 | 21 | 20 |
| Tensile stress after 7 days.. (*kg.*) | 23.6 | 25.7 | 27 |
| Tensile stress after 28 days.. (*kg.*) | 30 | 31 | 34 |

A characteristic of these superior materials is an apparent slight density which may fall to 0.750.

This, however, is a new quality and an advantage, because, with the same percentages in the mixture, fatter, more compact and more impermeable mortars can be made, with suitable granular composition of the sand.

These results and expectations are evidently of a kind greatly to astonish lime and cement makers, and, in particular, to encourage hydraulic-lime makers to enter into this new path opened out for them, which may revolutionize the hydraulic-lime industry, just as fused cement revolutionized the artificial cement industry by compelling it to advance in the path of progress with the appearance of the "super" and "standard" and qualities of "fused cement" excepting indecomposability in sulphate water.

Thus, there is promised a new type of material with all guarantee of stability and great resistance like a cement of the finest quality—greater resist-

(*Continued on page 32*)

# Job Stability and Increased Wages Will Hasten Return of Prosperity*

By WILLIAM GREEN
*President, American Federation of Labor*

STEADY employment and rising wage levels throughout industry, so that consumption may keep pace with growing productive capacity, are the keystone on which the arch of prosperity rests. If workers' buying fails, industry after industry must crumble, as we have seen in the past two years. . . . One of the chief reasons why we have this great problem of unemployment is because executives, in general, fail to realize its economic significance and to think of it as a business problem of the first magnitude.

Income losses of wage earners alone this past year have amounted to $11,000,000,000, compared with 1929 levels. This loss has cut the total sales of all our retail stores by 16 per cent, and has resulted in larger inroads still on the business of factories which supply producers' and consumers' goods. In fact, the destruction of business which has resulted from this wage loss is almost incalculable.

Thus, to take 8,000,000 men out of their normal economic function of producing and consuming means catastrophe for our business life. The wage loss of all wage earners this year has taken more money out of normal trade channels than the losses from all bank failures, plus the losses from all business failures, plus the loss which would result if our entire export trade were destroyed.

Even in normal times, unemployment involves huge business losses, for in 1929, the year of our greatest prosperity, unemployment averaged 2,400,000, according to reliable estimates. And the loss of potential wealth, represented by the wages of these workers at average rates, approaches $3,000,000,000.

As a nation we have not yet realized how much we depend on wage earners and small salaried workers as customers for our industries. We have in the United States 30,000,000 wage earners and about 9,000,000 salaried workers. Wage and small-salary workers—and this includes none receiving more than $5,000 a year—receive 54 per cent of the total national income. But they actually spend far more than 54 per cent. of all income spent to buy the consumer products of our industries. For, with their families, wage and small-salary workers form 83 per cent. of our entire population. Their physical need alone—food, clothing and housing—is the great primary demand on our consumer industries; their need for recreation—moving pictures, automobiles, radios—has been an immense builder of American industry in the last ten years; their need for transportation and communication has kept street-car lines running, started scores of new 'bus lines, sold 2,000,000 home telephones in the last decade.

America came out of the world war with a producing mechanism geared to war demands. During war years we had concentrated on production; our best scientific skill had been turned to create vast supplies of goods for an insatiable European market. But with the end of the war the market disappeared. Our production machine was adapted to the home market. We found it profitable to manufacture in mass for millions of home buyers. Mass production implies mass buying, and the masses of our people are wage and small-salary workers.

In the decade from 1919 to 1929 the rising standard of living and the billions of dollars' worth of goods bought by our workers was the very root of our increasing industrial activity and growing prosperity. In 1919 very few wage earners owned automobiles; telephones in workers' homes were almost unknown; radios were hardly in existence, and comparatively few workers' homes were even wired for electricity. The motion-picture industry was in its infancy.

In 1930 at least 13,000,000 wage-earner families owned cars; at least 10,000,000 workers' homes were wired for electricity; 2,500,000 telephones and 2,000,000 radio sets were installed in the homes of wage earners. There are over 20,000 motion-picture theaters, with an estimated attendance of over 15,000,000 persons, and most of their customers are wage earners.

In 1931 the wage loss alone, as noted above, was $11,000,000,000; adding salaried workers the loss has been estimated at $18,000,000,000. Automobile production was less than half that of 1929, textile industries produced 17 per cent. less, over 17,000 retail stores failed and over 2,000 manufacturing plants, and these defaults were due in large part to loss of workers' trade. Space does not permit to take the story further and show how these losses were carried back to producer industries. Suffice it to point out that loss of workers' buying had its crippling effect on our entire business and production mechanism.

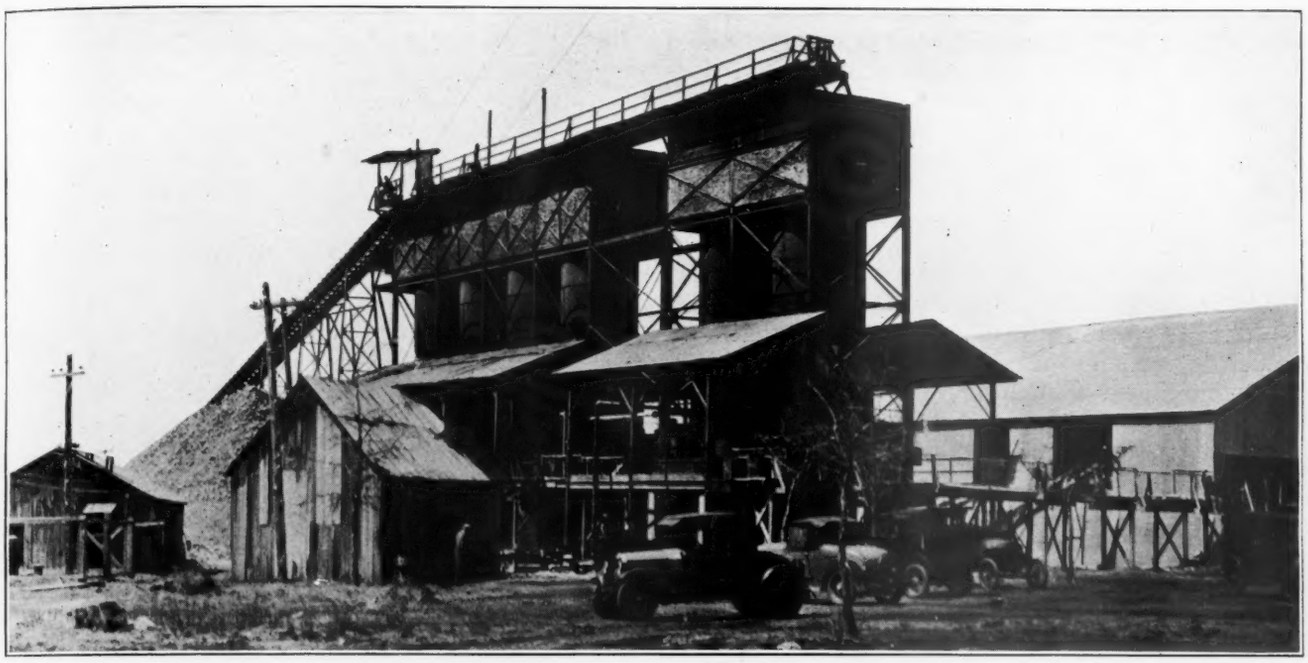
* Abstracted from an article in *Credit and Financial Management*, March, 1932.

## The Future of Hydraulic Limes

*(Continued from page 31)*

ances than those of natural cements, greater than those obtained twenty years ago with the best artificial cements, and even at the present time with ordinary artificial cements.

Experiments made with limestone usually giving inferior products 1.2 to 1.5 kg. in 7 days, demonstrated that, even in this case, the improvement represents resistances of 6 to 8 kg. after 7 days with 1:3 plastic mortar.



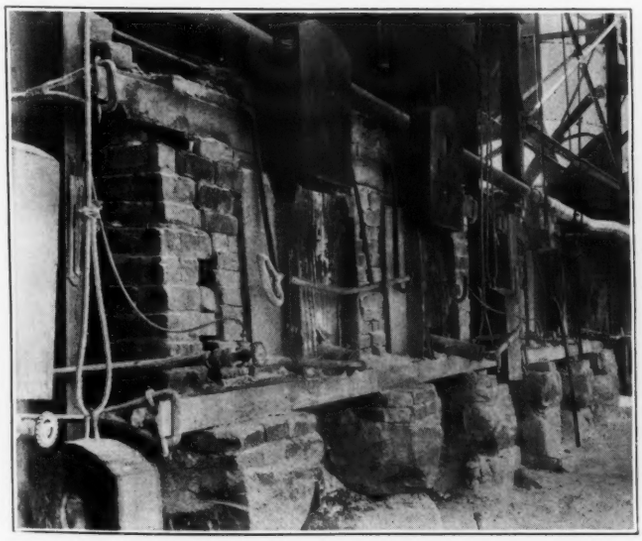
The plant of the Cheney Lime Co. near Birmingham.

# Alabama Lime Plant's Capacity Increased With Adoption of Natural Gas

## Reduction of Operating Staff Also Cuts Cost of Production for Cheney Company

SINCE its entry into competition with other fuels, natural gas has been a food for thought in almost every manufacturing enterprise. The convenience afforded by near pipe-lines—now covering the nation in a veritable network—makes this new fuel available to meet heat requirements from private houses to huge kilns.

In the nonmetallic-mineral industry natural gas was used for some years in the early natural-gas regions. Ohio, Pennsylvania and other petroleum and gas states have long been familiar with it. With the coming of long-distance pipe-lines, lime producers in the South were among the first to convert their coal or producer-gas furnaces to natural-gas burning. Some at first were hesitant to make the change, not wishing to risk the expenditure for the necessary piping installation and other incidental charges, pending the outcome of similar in-



Kiln furnaces show pipe-line and burners.

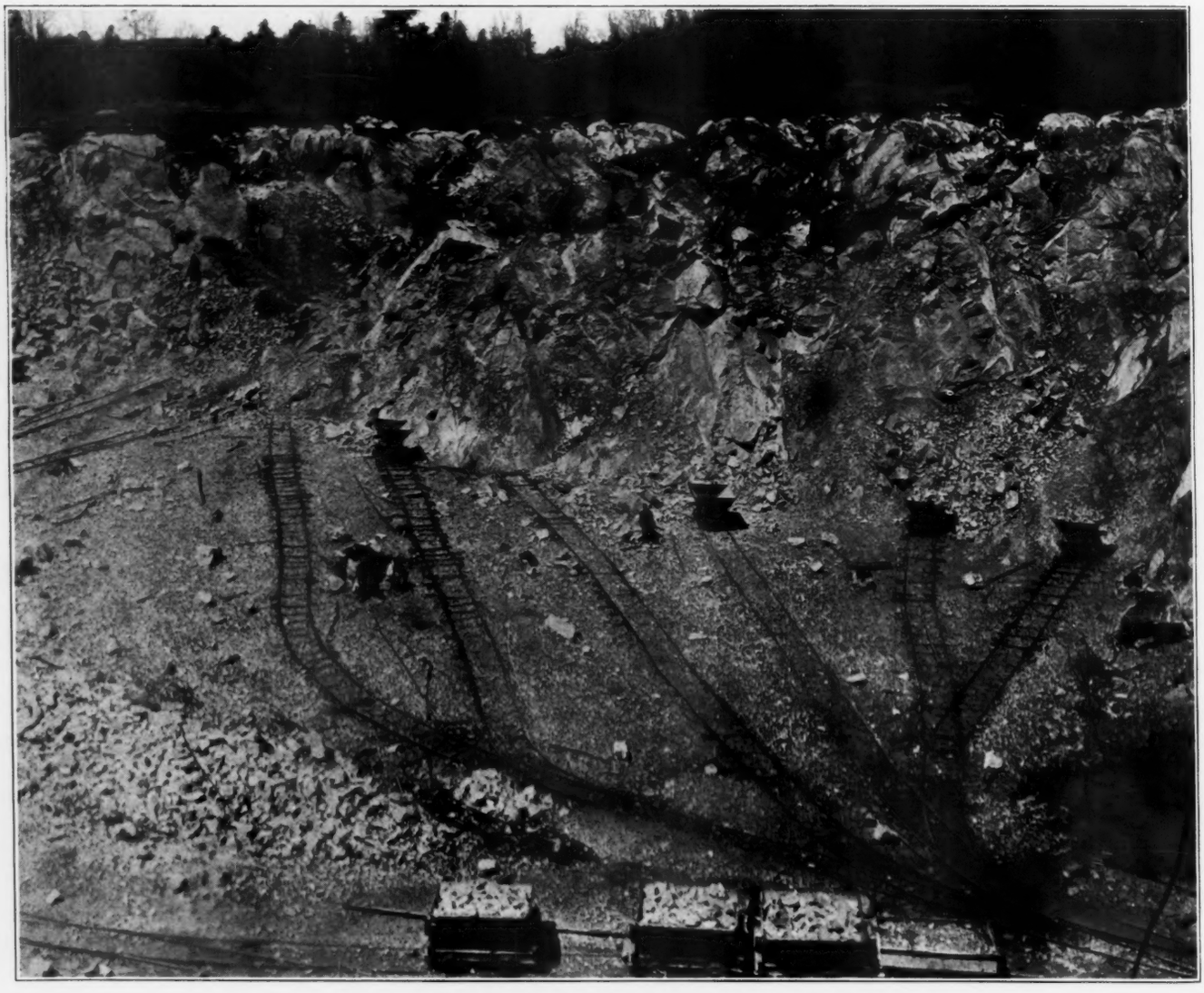
Cars unloading lime in the storage building.

stallations among other producers. Actual burning cost, based on the experience of several Alabama producers, has been consistently below that of coal-burning and in only one instance was the cost of natural-gas burning equal to that of coal burning. All producers interviewed expressed themselves in favor of the new fuel, claiming for it a cleaner and better-burned product, reduced operating costs, and increased production capacity per kiln.

Natural gas has been given a thorough trial at the Cheney Lime Co., Birmingham, Ala., plant, which is located a short distance south of that city. Here the company has for some years operated a modern 6-kiln coal-burning plant and a well-developed quarry. The kilns, designed by the Cheney Company, have steel shells which are 10 ft. in diameter and 31 ft. 6 in. high. The kiln furnaces are of the double-I type, lined with Harbison & Walker fire-brick. Above the kilns are brick hoppers reinforced by a steel framework and designed to provide an ample raw-material feed as well as to utilize as much as possible the heat of the waste kiln gases through pre-heating the raw spalls. All the kilns rest on substantial concrete piers, between which retriever cars receive the burned lime, later to be drawn over inclined tracks to the warehouse.

Quarry operations are conducted by methods similar to small-scale operations throughout the South. With an area already worked to an extent of five acres, the north ledge is now being recovered. Blasting on this 40-ft. ledge is done in two benches, each usually 20 ft. in height. From 10 to 20 holes are normally fired, these being drilled by Ingersoll-Rand and Chicago Pneumatic 7/8-in. and 1-in. drills, respectively. Du Pont 30 per cent. gelatin is the explosive usually employed. Blasted rock is selected by hand, the larger pieces being sledged to kiln size. Two systems of quarry-car tracks send their track spurs to ten or more loading positions. When loaded, mules draw the Virginia Bridge & Iron Works Co. quarry cars to the foot of the plant incline. No fewer than 20 men are employed in the quarry in loading the cars, they being paid on a piece-work basis. The quarry cars are drawn to the kilns by a 15-hp. motor-operated hoist.

To serve the plant for natural-gas burning, a 5-in. pipe-line was extended from the 22-in. main line which serves the district to a meter-house located on the Cheney Company's property. Here the gas is received at a pressure of 150 lb. which is reduced through a valve to 4¼ lb. After pass-



A view of the quarry showing the face and loading methods.

Inclined tracks from kiln floor to warehouse over which the freshly-drawn lime is transported to storage.

ing through the meters, the gas is conducted by a 6-in. line to points above the kiln firing doors. For the front side of the furnaces, 1-in. drop-pipes extend to each firing door. For the rear side 2-in. leads deliver the gas to the rear furnace-firing doors. Inserted in each furnace door is a 14-in. length of 2-in. pipe which acts as a burner. The gas is introduced into the burner pipe by means of a short length of ½-in. pipe from the feed lines. Each feed line is valved and tapped, the taps being connected by rubber tubes to glass U-tube manometers. Thus, each burner is under accurate pressure control, a pressure of 5½-in. of water being usually maintained.

Actual results of burning with natural gas disclose an increase in capacity of 3 tons per day per kiln, resulting in a production of 15 tons per day per kiln. Six thousand cu.ft. of gas is required per ton of lime produced, according to present data. The cost has been somewhat under that of coal on a ton-of-lime-produced basis, but a larger saving is accounted for by the fact that the operating staff is reduced to but one man or two men.

Burned lime is received in the steel cars previously mentioned and these are drawn to the warehouse paralleling the kilns. The tracks, six in number, extend directly into the warehouse at a height of at least 12-ft. above the floor. Individual hoists on each track draw the cars to their dumping point, usually over piles of bulk lime. The hoists are driven through a line-shaft and are individually clutch-controlled. The warehouse is 60 ft. by 130 ft. in size. Equipment is installed for the shipment of bulk lime, bulk lime in barrels or sacks, and crushed lime.

## Can Proper Lubricants Be Purchased on Specifications Only?

By K. A. NEWMAN
*Research Staff, E. F. Houghton & Co.*

THE present tendency toward purchasing all materials on specifications is undoubtedly a step toward wiser and more scientific buying. However, specifications are not a cure-all and should be applied with intelligence.

A set of specifications can never take the place of business integrity and, unfortunately, specifications have frequently served as a clock for the unscrupulous supplier. This is frequently true in the purchase of lubricating oils.

No set of specifications, however inclusive, has ever been able to guarantee the quality of lubricating oils. This is due to the fact that that intangible quality "oiliness" or "lubricating ability" can not be covered in a set of specifications. Of course, if the supplier could specify the exact nature of crude from which the oil was to be refined and all the details of refining, as well as the final specifications of the oil, he might be more nearly sure of the quality of the oil bought on specifications. But then how could he tell whether all his specifications regarding the source and manufacturing process had been adhered to? Hence, if a set of specifications can not guarantee the quality of the product purchased it seems wiser to buy on the integrity of the supplier for furnishing the best product for a given purpose at an economical price.

The specifications of an oil refer to its physical specifications and not to its lubricating ability. A set of specifications is usually created by analyzing some oil which has been successful on the job. The physical properties of oil usually referred to are: (1) Viscosity; (2) flash point; (3) fire point; (4) cold test or pour test. While these factors look fine on a laboratory report, they do not indicate the lubricating value of oil, nor do they insure the satisfactory performance of the oil.

1. *Viscosity.*—The viscosity of an oil merely measures its ability to flow through a certain size of orifice. The temperature of the oil has a great influence on its viscosity, and, therefore, for purpose of comparison, viscosity readings are usually taken at a temperature of 100 deg. F. (38 deg. C.). However, the size of the orifice in the bearing being lubricated and the temperature of the bearing seldom agree with the size of the orifice and the temperature at which the viscosity test was taken. Two oils having the same viscosity in a laboratory test taken at 100 deg. F. (38 deg. C.) may not have anywhere near identical viscosities at the somewhat higher temperatures under which they may be required to operate.

Oils of the same viscosity can be made from either asphalt-base crude or Pennsylvania crude, and yet their lubricating values will differ greatly. Therefore, viscosity readings do not mean much except to the experienced lubrication engineer, and to the oil refiner as a check on the uniformity of his product.

Viscosity is useful as an indicator of internal friction, as a thick oil will have greater internal friction than a thin oil. But here again it means nothing, unless taken at the temperature at which

(*Continued on page 44*)

# Trade Commission Makes First Report in Probe of Cement-Prices Bases

## Alleged Violations of Anti-Trust Acts To Be Reported Upon at an Early Date

THE Federal Trade Commission has made public its first report on its investigation of price bases, which is an inquiry into the methods of basing prices with respect to location. The purpose is to give help toward a solution of the problem of a greater economy in distribution. The current report is entitled *The Basing-Point Formula and Cement Prices.*

While some data obtained from studies of the cement industry are used in the price-bases report, the commission also is conducting, under a senate resolution which relates to the cement industry, a separate inquiry into alleged violations of the anti-trust acts, and it is expected a report soon will be made on that subject.

The price-bases inquiry was undertaken on the commission's initiative. In its resolution authorizing the study the commission recognized as "one of the chief problems of the day," the "economical distribution of commodities." The commission believed that the method of determining the prices (or the total cost to the purchaser) of commodities sold in the same or in different localities was "an important factor in a sound system of distribution," and it was aware of "various systems and theories on which such prices are made and marked differences of opinion as to their expediency and fairness."

The commission further observed that "some distributors are employing the policy of national distribution with prices, particularly in different consuming territories, that make no allowance for difference in transportation costs, while others allege that there should be a delimitation of markets having respect to transportation expenses."

It was resolved that the commission's chief economist should "inquire into and report upon: (1) the factory-base method, the basing-point method, and the delivered-price method of quoting and charging prices (including their respective variations), together with any other method of differentiating prices with respect to location; (2) the causes for the adoption of the several methods employed and the purposes intended to be served by them; (3) their actual and potential effects upon prices and competitive conditions; and (4) any constructive measures which might be employed to promote greater efficiency, economy or fairness in the methods of quoting or charging prices."

Prior to passage of the price-bases resolution, the commission had experience in matters of price basing in the prosecution of its well-known "Pittsburgh-plus" case. The large steel corporation involved was ordered to cease and desist from its "Pittsburgh-plus" arrangement in quoting prices. This case is an illustration of the basin-point method. A Pittsburgh mill could sell its products to fabricators and manufacturers in the Pittsburgh district at factory prices, but the same class of customers outside that district were charged, in addition to the Pittsburgh price at the factory, the freight charges from Pittsburgh to the outside point. But fabricators or manufacturers situated in Chicago, who bought products from the same steel corporation's Chicago factory, had to pay just the same price—that is, the Pittsburgh factory price plus the freight from Pittsburgh to Chicago.

The present report of the commission is being submitted to Congress for its use in considering problems of distribution. The letter of submittal, containing a summary of the report, follows:

"To the Congress of the United States:

"On July 27, 1927, the Federal Trade Commission directed an inquiry into the methods of basing prices with respect to location as a step toward the solution of the problem of greater economy in distribution. These methods include the selling on the bases of: (1) shipping-point prices; (2) uniform delivered prices, either country-wide or by zones; and (3) delivered prices made under what is known as a basing-point system, such as was used by the steel industry prior to the commission's cease-and-desist order, and which is now used by it in a modified form. This inquiry is intended to discover the causes for the adoption of these various methods, and their relation, if any, to the matter of competition, differences in prices, price levels, and cross freighting or other needless costs. The present report, the first of the inquiry, deals chiefly with the multiple basing-point system, as employed by the cement industry.

"Prices may be classified with respect to the place of transfer and the incidence of transportation cost into: (a) shipping-point, and (b) delivery-point, or delivered, prices. The former are those for commodities whose transfer of title usually occurs at the shipping point and whose transportation cost from point of origin to any point desired by the buyer is borne by him separately from the price. The latter are those for commodities whose transfer of title usually (sometimes modified by custom or contract) occurs at the delivery point and whose transportation cost from shipping point to a specified destination is paid by the seller and, to the extent borne by the buyer, included as a part of the delivered price.

"Basing-point delivered prices are the sum of a recognized established price for some point called the basing point and specified freight charges from such point to the several destinations for which

these prices are made, this formula controlling the price, regardless of actual origin of shipments or of actual freight incurred. A single basing point may be used by an industry, or there may be two or more. Under the multiple basing-point formula, the delivered price for any destination is that sum of price at some basing point and freight therefrom, whichever is lowest, all basing points considered.

"A variant of the basing-point price is the zone price. This is a delivered price uniform for all destinations in each of a series of specified areas, or zones, and is the sum of a price for basing point, or area, and some sort of average of freight rates therefrom to destinations in the zone. Closely akin to the zone price is the single uniform delivered price for the country as a whole, sometimes called the postage-stamp price.

"*General Survey of Industry.*—In a country-wide survey of the price-basing methods used by manufacturers, it was found that of the more than 3,500 reporting firms, including manufacturers in practically all industries, 44 per cent. sell on an exclusively shipping-point price basis, 18 per cent. on an exclusively delivered price basis, and 38 per cent. on both bases.

"Each of eight out of fifteen industry groups shows more than 50 per cent. of the reporting firms in the exclusively shipping-point class, while no industry group has 50 per cent. in the exclusively delivered price class. Transportation equipment shows the highest percentage of plants on an exclusively shipping-point basis.

"Of all firms reporting shipping-point prices, 15 per cent. make all or a part of these prices with partial freight allowances. Such allowances are usually for the purpose of equalizing freight with the competitor freightwise nearest the buyer's destination. The industry-group which leads in this practice is iron and steel and products (excluding machinery).

"Of firms reporting delivered prices, those whose prices are uniform for all destinations show the largest percentage, those whose prices are uniform for zones coming next, and finally those selling on basing-point prices. Of the several industry groups rubber products shows the highest percentage of firms with delivered prices uniform for all destinations; chemicals and allied products, the highest percentage of firms with delivered prices uniform for zones; and iron and steel and products (excluding machinery) the highest percentage of firms with delivered prices made by the use of a basing point. In a proceeding before this commission the single basing-point system of that industry, as employed by the United States Steel Corp., was in issue and was concluded by an uncontested order of the commission requiring the respondent to cease and desist therefrom.

"*Basing-Point System in Cement.*—The cement industry affords a striking illustration of the multiple basing-point method of merchandising. It is an industry that supplies one of the principal materials in road-building, for which about one-third of the entire cement output is used, and it is also one of the three or four important industries for structural materials, about one-fourth of the cement output being so used. Its growth has been rapid, the production of cement having more than trebled from 1908 to 1928, the latter being its peak production year.

"Although cement mills are found in 32 out of 48 states, shipping distances are great. The weighted average freight rate paid on shipped cement in 1927 and 1928 was 38 c. per bbl., or about 22 per cent. of the average mill price. Moreover, for large numbers of shipments by many different mills widely scattered this percentage, representing the ratio of freight rate to mill price, ranges upwards to above 50 per cent. It is obvious that the ratio of freight rate to mill cost is considerably higher than the ratio to mill price.

"Cement manufacturers sell their cement on a multiple basing-point system, whereby a uniform delivered price for each point of delivery can be calculated with mathematical precision, provided only that base prices and rail freight rates are known. Freight rates are compiled coöperatively by the cement industry and are furnished to the manufacturers. This factor is therefore definite and uniformly applied. Base prices are easily ascertained and generally known. When any mill has a mill price sufficiently low that the sum of this price and the freight to any single delivery point makes a delivered price lower than that of any other mill similarly calculated, such a mill is a basing-point mill and such a mill price is a base price. Some 85 or more mills in the industry were located at basing points in the middle of the year 1930. Non-basing mills, of which there were about 80 at that time, sell cement only on the delivered prices made by some basing-point mill or mills.

"*Divergence of Mill-Net Prices.*—The most significant aspect of the basing-point system is found in the divergent mill-net prices which usually prevail under that system and obtain in a marked degree in the cement industry. Widely different mill-net prices realized for any one mill at any one time upon substantial portions of the mill's sales are indicative of very imperfect price competition, because competition in price implies the frequent shading of a competitor's price, when costs allow, as an inducement of the seller to divert buyers from that competitor's product to his own. And the seller's costs presumably do allow it, if he is making to one group of buyers lower mill-net prices than to some group or groups of buyers elsewhere in order to secure additional volume. Under active price competition the higher net prices tend to be shaded and sales to the lowest net-price group discontinued, if necessary, until net prices generally are substantially equal.

"Out of sales of 16,000,000 bbl. made by 51 cement manufacturers to dealers in 21 cities, 1927 to 1929, only 35 per cent. were made at the respective mill's maximum net prices prevailing at the time of the sale. On 65 per cent. of the sales there were deviations from the maximum mill-nets ranging up

to nearly $1 per bbl. Thirty-four per cent. of the sales show deviations of 1 c. to 20 c. from the maximum net; 21 per cent. deviations of 21 c. to 50 c.; and 10 per cent., of 51 c. and upward.

"Similar results are shown for 3,000,000 bbl. of cement sold by 14 manufacturers to Wisconsin dealers in 1927; for 7,713 bid delivered prices for 9,000,000 bbl. to five state highway commissions in 1929; and for the total sales of six mills located in four states covering 4,000,000 bbl. to widely-scattered destinations.

"*Uniformity of Delivered Prices.*—Two other tests may be applied to basing-point prices in the cement industry to determine their competitive character: (a) that of price uniformity, and (b) that of price constancy or inflexibility.

"Uniformity of delivered prices made by two or more sellers for any one point of delivery, taken in connection with a great divergence of mill-net realizations and a high degree of constancy of prices over considerable periods of time, becomes a measure of the perfection with which the basing-point formula is working, instead of signifying competition, since only as the formula is violated will there be diversity of delivered prices at a particular point.

"Examination of manufacturers' invoices to dealers in 21 cities covering 22,000,000 bbl. of cement in 1927, 1928 and 1929, shows 100-per cent. uniformity in delivered prices to dealers in 13 cities and in three other cities practically complete uniformity, from 5 to 17 manufacturers being involved in the case of each city. No city shows less than 81-per cent uniformity. One-hundred-per cent. price uniformity means that, as regards the invoices examined, all producers sold to all dealers in a given city at exactly one and the same price, the price obtained by applying the formula, viz., the lowest combination of base price and freight rate.

"While 94 per cent. of the total of these sales were made at uniform delivered prices, only 35 per cent. were made at maximum mill-net realizations. That is, while there is a high degree of uniformity of delivered prices for two or more manufacturers on sales to one or more buyers at the same point, the degree of uniformity of mill-net realizations by a given manufacturer at a given time on sales to buyers freightwise differently located is relatively very low. That the two conditions should prevail for the same sales is highly indicative of a low state of price competition.

"Similar results appear on sales of 2,900,000 bbl. of cement made in 1927 to Wisconsin dealers and on nearly 8,000 bid prices to five state highway commissions in 1929.

"*Inflexibility of Price.*—A third test that may be applied to basing-point prices to determine their competitive character is that of their flexibility or variability through a period of time, indicating the degree of their sensitiveness to changes in the demand and supply of the commodities to which they apply. Where the various producers sell a substantially similar product in an industry not under public control, and the wholesale price of its product is unusually inflexible for a considerable period, and an examination of demand-and-supply conditions for that period shows no corresponding constancy, there is a reasonable basis for the belief, due allowance being made for the influence of inertia and custom in price-making, that either the supply or the price of the product is not determined by normal competitive processes.

"In respect to the delivered prices of cement during the past few years, the formula price was maintained for Baltimore throughout 1927. Washington, Wilmington, Philadelphia and New York each had but one change in that year, which occurred in January; Chicago and Minneapolis over a period of 32 months, in 1927 to 1929, had but two changes each; Cleveland in the same period, four changes; Indianapolis, four changes in 33 months; St. Louis and Madison, Wis., each three changes in 33 months; and Birmingham, three changes in 24 months.

"In respect to basing-mill prices, attention is called to four great producing centers. The Lehigh Valley mills, some 22 in all, maintained their prices on a dead level from January, 1927, to November, 1930, except in the period, August to November, 1929. Prices of the Hudson Valley mills followed the same course, except that from November, 1929, to November, 1930, they were 10 c. higher than for the period prior to August, 1929. The price curve for the Buffington (Indiana) mills was very similar, except that during the last year of the period the price was 10 c. lower than for the period prior to August, 1929. The Birmingham mills show a price curve declining rather consistently from January, 1927, to August, 1929, but rising in November, 1929, by 50 c. per bbl. in a single jump.

"*Factors Contributing to Imperfect Competition.*—There are several obvious conditions in the cement industry which, though they may not be the primary cause of its imperfect price competition, yet are clearly contributing factors thereto. If delivered prices under a basing-point system are unduly high, they begin in high prices at basing-points of which there are comparatively few. One of these conditions, therefore, may be found in the effective use the industry makes of leadership. All cement mills, as regards price-making, fall into two classes: (a) those that assume price leadership, and (b) those that do not. A mill that establishes a price at its mill point and delivered prices for other points lower than the base price of any other mill together with freight therefrom to those points, respectively, makes of itself a basing-point and assumes price leadership at all such points. Outside such points it follows the leadership of other basing mills as regards prices. The non-basing mill assumes no price leadership but adopts the delivered prices of others as it finds them. This may also be true of a mill located at a basing-point where there are two or more mills. Many mills are so located. Such a price policy has directly only a negative effect upon the level of prices and in that sense denotes an absence of price competition on the part of these mills.

"Six companies (now reduced by merger to five),

operating 46 plants east of the Rocky Mountains, produced, in 1927, 47 per cent. of the total output of that part of the United States. Another 30 per cent. was produced by mills at non-basing points, and 18 per cent. by mills at or near the basing-point mills of these six companies. This accounts for all but 5 per cent. of the entire output east of the Rocky Mountains.

"Such concentration gives a favorable basis for mill-price leadership, made effective in part by the basing-point formula which, though not of itself the primary cause of non-competitive mill prices, becomes a powerful instrument in their maintenance. Under a relatively inflexible mill-price policy shipping long distances and absorbing freight becomes a seeming necessity in order to expand volume of output, the urge of every producer under the spur of idle capacity. Under relatively-high mill prices this freight absorption becomes possible without breaking the mill-price structure or incurring loss. The formula acts as a protection to the price structure, for its strict observance requires that the price at no point of delivery be reduced by a given mill below the then lowest combination of base price and freight, except as that mill lowers its own mill price sufficiently to make the new delivered price. Since such a reduction under the formula automatically lowers the price and realization in the mill's most profitable territory, observance of the formula tends to preserve not only the base price governing the mill's maximum net price territory, but all base prices effective in its under-maximum net price territory.

"When the basing-point formula is working 100 per cent., there is no competition in price at the point of delivery except by the change of some basing-point price. However, there is an occasional recalcitrant producer in the cement industry who violates the formula either frequently or occasionally. Cement brands being practically alike, and producers' distributing services highly standardized, a slightly reduced price gets the business. Usually this is effected by the mill's discontinuing the formula prices in shipments to some delivery point, or points, without such reduction in its mill price as would make the net on these shipments its maximum mill net. This practice, when other mills hold to the formula price, gives the cut-price mill a higher average mill net than would going farther afield with high freight and selling costs, and at the same time enables it to run at more nearly full capacity with further advantages in cost.

"Among the several methods used against such an offender the most drastic is that of compelling him to reduce his mill net price by putting in the equivalent of a base price in his highest-priced territory, thus reducing the net price previously realized by him. By this method such a mill may have its average mill net reduced below cost.

"Some of the companies disposed to price independence have been eliminated by acquisition, either by the highway of 'benevolent assimilation' or over the rough road of bankruptcy. Several instances of this character have come to the attention of the commission.

"The merger movement in the cement industry has contributed to more effective leadership, not only by eliminating in some instances a specific company disposed to price independence, but also by reducing the number of minds to synchronize. Several mergers have been effected in recent years, the most notable one being that of the Universal Portland Cement Co. and the Atlas Portland Cement Co., of January, 1930.

"Yet another condition contributing to imperfect competition is in the activities of the industry, operating chiefly through its various associations, in collecting and disseminating operating information, in compiling and distributing cement freight rates, and in checking up violations of the industry's code of commercial practices.

"The use of a uniform freight rate by the industry is essential to the finding of a uniform delivered price under the basing-point formula. To accomplish complete uniformity of rate, freight-rate books are compiled by the industry. Since freight rates are quoted in railroad tariffs in cents per 100 lb., but delivered prices are quoted by the manufacturer in cents per bbl. it is necessary, before using the rate for price-making purposes, that it be converted to a barrel equivalent. This computation usually results in fractional cents which, in order to have a price in even cents, must be fractionally increased or decreased. In order that like results in delivered price be arrived at in the use of the freight-rate books, a conversion table has been published in the fore part of each book, the use of which makes it certain that, if the formula is followed, the prices of all producers at any given point will be identical.

"It is this conversion table that makes the freight-rate book something more than a book of freight rates for the calculation of freight bills. Its admitted purpose is 'to permit the manufacturers to make a ready calculation of the destination prices figured in barrels.' The per-barrel rate shown by this conversion table is seldom an actual freight rate and freight bills acceptable to the railroads could not be computed by its use. If, as asserted by cement producers, the difference of 1 c. per bbl. may make the difference of a sale, it is seen how essential the conversion table is in arriving at uniform prices where fractional cents must be dealt with.

"*Price Differences.*—Differences of mill-net prices as marked as those in the cement industry not only are an indication of imperfect competition, but are themselves found to affect buyers, and in some instances competitors, unequally. The mill whose base price and freight rate made the Chicago delivered price in 1927 is located near Chicago. This mill's output for that year was more than 9,000,000 bbl., while Chicago's consumption was about 3,800,000 bbl. Less than one-third of this consumption was supplied by this mill, which at the same time shipped large quantities long distances on which it realized a mill-net far below that realized on its Chicago shipments. Its average mill net realization for that year on all shipments, including those to Chicago, was 22½c. per bbl. below its net on Chicago shipments. Had mills generally been

following a system of selling fully competitive, this mill could have supplied Chicago's requirements for 22½c. per bbl. less than the city paid and still have realized the same average net it realized under the present system. This would have meant an estimated saving to the city for that year of more than $800,000, which represents the unnecessary transportation element in the Chicago delivered price.

"The attempt has been made at times to restrict arbitrarily the application of a base price to a given territory, even though this resulted in a delivered price outside this territory higher than would have been made had the base price been permitted to control and in differences of net realization not directly occasioned by competition at the point for which the lower net was received. This occurred as between the Ironton, O., and Birmingham basing points, at each of which the same company operates a mill. Because of the low Ironton price relative to the Birmingham price, the Ironton base mill was making delivered prices in a territory to which the Ironton mill could less profitably ship than could the Birmingham mill—an indication that the ratios of base price to factory costs or other essential conditions were out of competitive harmony. In another case, it was found that a dual base price was maintained by one mill for some years, whereby one base price was made to apply to the State of Michigan and a higher base price outside the state.

"Perhaps the most objectionable of all cases of price differentiation found in connection with the cement industry's use of the basing-point system is that resulting from one mill, or group of mills, setting the mill price of another mill, freightwise differently located, above which it may not go—objectionable not only because the aggressor mill makes lower mill-net price to one group of buyers than to another which it itself initiates, but because the setting of a relatively-low mill price for another mill reduces its own average net realization much less than that of the mill whose mill price is thus set. Such price differences were found both where the mill against which these tactics were being employed was a state-owned mill and where the mill was one showing marked independence in its price policy by frequent failure to observe strictly the formula system.

"The outstanding case of this kind, coming to the attention of the commission, was that of the South Dakota state plant located at Rapid City. According to the statement of the chairman of the state cement commission, the state mill has had little choice in the naming or making of a mill-base price, its competitors putting out quotations to the cement trade shortly after it started operation in 1926 which fixed its base price and this it felt forced to accept. Since then these quotations based on Rapid City have been changed from time to time, the changes originating with the state plant's competitors. In August, 1929, when cement prices were being reduced generally, the mill's competitors lowered the quotations based on Rapid City by 20 c. In January, 1930, these competitors renewed those low quotations which were based on Rapid City, when at the same time they raised the quotations which were based on their own mills.

"*Cross Freighting.*—Substantial differences of mill-net prices, both an evidence and a result of defective competition, not only affect buyers and competitors unequally, but furnish in the aggregate a measure of the uneconomic production and transportation costs attendant upon the use of the multiple basing-point system. Included in such transportation costs is that of the cross-haul between two market areas of a standardized commodity for which the freight cost is relatively large. This and other phases of the basing-point system might be clarified by a study of costs. These costs have been submitted to the commission by the cement industry, but, at the time of completing this report, had not yet been analyzed and are reserved for a supplemental report should this seem to be justified by the results of the analysis.

"The cross-haul is generally recognized by the cement industry itself as an economic evil. Cement manufacturers who discussed the matter with representatives of the commission almost without exception admitted the prevalence of the practice in the cement industry and also its unsoundness, though not all seemed to recognize the causes of the practice or its implications.

"An approximate measure of the uneconomic production and distribution cost imposed by a system of selling not fully competitive is found in a mill's freight absorptions, *i.e.*, the excess of its average price at the mill for a given period over its weighted average mill realization, or net price, on all shipments for that period. On cement sales of 141,000,000 bbl. for 1927, representing 81 per cent. of the total shipments for that year, this excess amounted to an average of 24.3 c. per bbl. or a total of $34,000,000. Applying this per-barrel rate to the entire shipments for 1927, the total would amount to about $42,000,000. Of the total production and selling cost, these freight absorptions are estimated to amount to an average of about 20 per cent., widely deviating from this average, however, as regards individual mills or regions. This estimate represents the maximum amount that could be saved by eliminating cross-freighting.

"The explanation of the uneconomic movement of commodities is commonly said to lie in the 'hunger for tonnage.' This explanation, however, ignores one significant circumstance attending the practice under the basing-point system, viz., the manufacturer does not seek to satisfy his hunger for tonnage through increase of sales by a lowering of the delivered price to the consumer so much as by an intensifying and widening of his market at the same consumer price, though this involves extra transportation cost and so a lower price yield to himself.

"The habitual practice of the cross-hauling of a standardized commodity, like cement, appears to be due primarily to a rather rigid maintenance of mill prices at a relatively-high level and only secondarily to 'tonnage hunger,' as often alleged. The high level of mill prices makes the cross-haul pos-

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# The Nonmetallic-Mineral Resources of MISSISSIPPI

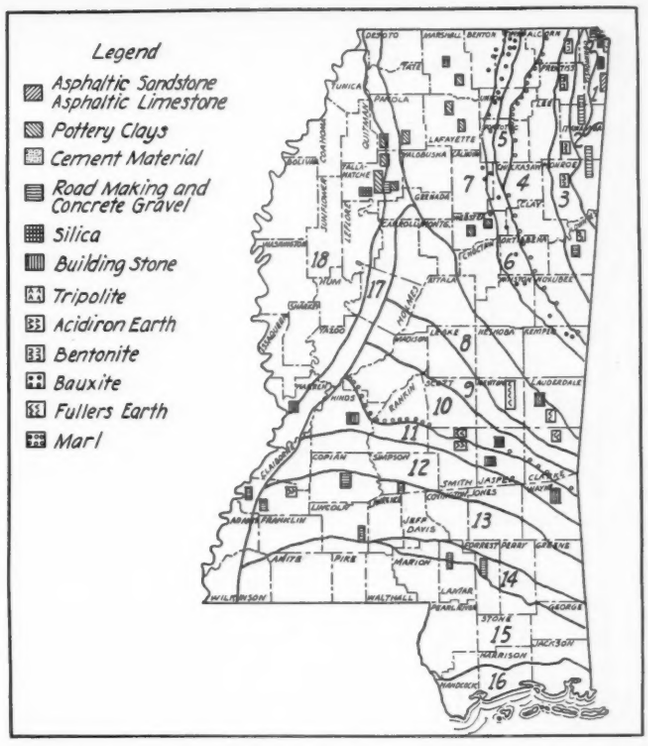
By HUGH DONALD MOORE
*Asst. State Geologist*

MISSISSIPPI has a wealth of nonmetallic minerals some of which are exploited but most of which are left dormant in the ground. The reason that Mississippi has not done more in the production and exploitation of her natural resources can be laid at the door of cotton. Numerous instances could be related to show that, during times of low-priced cotton, materials were mined and shipped to points out of the state to be manufactured. In times of high-priced cotton the shipping of these materials ceased.

Commercial deposits of nonmetallic minerals are the only ones that will be considered in this article. They are: asphalt sandstone and asphalt limestone, clays, cement material, road-making and concrete gravels, sand, silica, building stone, limestone, tripolite, marls, fullers' earth, acid-iron earth, bentonite, and bauxite.

Mississippi has two gas fields, one of which has an open flow of more than 2,000,000,000 cu.ft. per day, and the other of more than 15,000,000 cu.ft. per day. The B.t.u. or heat-unit values are around 1,000, and the rock pressure is around 980 lb. Space at this time will not permit the writer to consider further the possibilities of oil and gas.

*Rock Asphalt.*—Asphaltic sandstone and asphaltic limestone will be spoken of hereafter as rock asphalt. Rock-asphalt deposits are found in the extreme northeastern part of the state in close proximity to the Alabama line, in the County of Tishomingo. Recent investigation has proved that the deposits are much larger than has been thought in the past. The fact that they are within 3 or 4 mi. of the railroad makes them of more interest from the standpoint of shipping. In the area of Cypress Pond deposits of rock asphalt are exposed to the surface, with very little overburden of soil. Along Cripple Deer Creek and Bear Creek they have a thickness of from 12 to 25 ft. exposed, with a possibility that there is more deeper down. The color of the exposed rock is brown to black and there is little life; this is probably due to leaching. Fresh exposed surfaces reveal the fact that these deposits are highly impregnated with bitumins; some in liquid form is found. These deposits are continuous along these creeks for several miles. The outcrops can be traced in a southeastern direction into Alabama, where they are being worked by the open-pit method.




**Geological map of Mississippi, showing formations. Periodical divisions are: Paleozoic—1, Mississippian. Cretaceous—2, Tuscaloosa; 3, Eutaw; 4, Selma Chalk; 5, Ripley. Eocene—6, Midway; 7, Wilcox; 8, Lower Claiborne; 10, Jackson. Oligocene—11, Vicksburg; 12, Catahoula; 13, Hattiesburg. Miocene—14, Pascagoula. Pleiocene—15, Citronelle. Pleistocene—16, Port Hudson; 17, Loess. Recent—18, River Alluvium.**

It is believed that, by a systematic coring of this area, the deposits will be shown to be from 10 to 15 mi. in length, and from 1 mi. to 3 mi. in width, with very little or no overburdening soil. The thickest overburden soil observed was 14 ft. deep.

The asphalt sandstones occur in the Hartselle member of the Mississippian or Upper Carboniferous series. The asphalt limestone is also a part of the Hartselle and in places it is very fossiliferous. A complete analysis of these asphaltics has not been made, but it is believed that they will compare favorably with the deposits which are being worked and shipped only a few miles east in Alabama.

Very satisfactory results have been received in laying this rock asphalt of Alabama cold on the streets of Florence in that state. Another strip of some 5 mi. in length has been laid on the highway leading out of Florence and has served satisfactorily. In Dallas, Tex., 150 sq.yd. of street paving has been laid, and it is proving to be very fine pavement. One feature of this asphalt rock is that, in being laid cold, it is very easy to patch in case holes develop in the roadway.

The Mississippi Geological Survey has not as yet made a complete study of these deposits of rock asphalt to warrant the publication of a bulletin, but it is planning to do so in the near future.

*Clays.*—The clays of Mississippi are among her

most valuable assets. They fall into two main classifications: (1) common, or brick and tile, clay; (2) high-grade pottery or ball clay.

The common, or brick and tile, clay is found in practically every county of the state. The accompanying map shows no hatching for brick and tile clay for the reason that the whole state would have to be hatched except for a very few localities. These clays usually burn red, and are chiefly used for making brick and drain and roofing tile. Some of these clays are also used in the manufacture of terra cotta, which is beautiful and ornamental. Some of them would make good high-grade vitrified brick. There are no vitrified bricks being manufactured as yet in the state, although a great many are bought from outside the state for paving.

At one time the state had more than one hundred brick plants,—however, this number has been reduced, and the plants to-day are much larger, serve larger areas, and produce better grades of brick.

The deposits of pottery clay in Mississippi are enormous, especially in the counties of Tishomingo, Benton, Lafayette, Marshall, Webster, Panola, and Tallahatchie.

The Marshall County pottery clays near Holly Springs have an average thickness of 5 ft. to 15 ft.; some have shown a thickness of 40 ft. exposed. A comparison of these clays with the average rational analysis of other stoneware clays made by Hopkins shows the following results.

| | Holly Springs Clays | Pennsylvania Clays |
|---|---|---|
| Clay substance ..... | 56.51 | 56.65 |
| Free silica ..... | 30.48 | 37.45 |
| Fluxing impurities .. | 3.94 | 4.44 |
| Moisture ..... | 1.23 | 1.57 |
| Total solica ..... | 64.69 | 65.00 |

The pottery clays of Marshall County are of high grade and are white and sometimes pink in color. They have an average specific gravity of 2.56. In water these clays slake with moderate rapidity to a fine grain. The average tensile strength is 62 lb. per sq. in. For plasticity these clays require 30 per cent. of water. The amount of air shrinkage is about 7 per cent.

One of the most remarkable deposits of white clay is in Tallahatchie County. Not only are white stoneware clays found there in large deposits, but also china clay or kaolin, fire clay, refractory bond clays, and face fire-brick clays. These deposits are believed to be as large as if not larger than, any others in the United States, underlying nearly all the soil and being exposed in two counties.

The china clay or kaolin has very little if any foreign matter to discolor or mar the product made from it. It burns white and is brittle. These clays will make the finest of porcelain ware.

The ball clay is of the white variety and can be used in the making of earthenware, wall and floor tile, and electrical insulators.

The fire clays are for the most part the type which will withstand high temperatures. An excellent grade of fire brick, refractory cement, furnace linings, and crucibles can be manufactured from them.

Clays suitable for the manufacture of stoneware and chemical stoneware are also found in these deposits.

These clay deposits taken as a whole extend roughly in a continuous line through Tallahatchie County and Panola County. There is exposed in some of these hills as much as 18 to 40 ft. of clay. Borings that have been taken show some of the clays to have a thickness of as much as 100 ft. or more.

For the most part these clays can be transported to the clay piles by gravity feed. Open-pit mining would be the method of securing the clay. Recently there has been laid through this area a pipe line carrying natural gas, which would aid greatly from the standpoint of fuel. This locality is also served by the Yazoo and Mississippi Valley and the Illinois Central Railroads.

*Limestone.*—In the extreme northeast part of the state is found an extensive deposit of limestone of commercial importance. This material when fused at suitable temperatures and then ground to fine powder, will set to a firm cement on the addition of water making what is known as a natural cement. In places these limestones are crystalline in texture.

These deposits are at the surface with very little if any overburdening soil. They are exposed in large cliffs 20 to 30 ft. high. They are accessible to railroad and water transportation. The rock could be loaded into boats in the river by gravity.

*Gravel.*—The road-making materials and concrete gravels are found in abundance in three localities in the state as shown on the map. Deposits of gravel have been worked or are being worked on a large scale in Lowndes, Itawamba, Tishomingo, Forrest, and Copiah Counties. There are other large deposits of gravel in Tallahatchie and Panola Counties. Small gravel pits that are used for local gravel roads are too numerous to mention.

The principal deposits of Tishomingo and Itawamba Counties are composed chiefly of opaque white chert and contain big subangular pebbles. They are spoken of as the Tuscaloosa gravels. The gravels of Lowndes County are about the same, except that they show that they are more water-worn.

The Grand Gulf gravels are in a belt which extends across the state from a point on Mississippi River above Natchez to Hattiesburg. The gravels as a rule are much smoother than the Tuscaloosa, and smaller in size. They are composed of transparent quartz crystallines and white-to-yellow opaque cherts. For the most part they are clean and have very little clay mixed with them. They occur in massive beds. At Hattiesburg there are five gravel concerns shipping sand and gravel. The gravels are sorted in two sizes, as is the sand.

In the northeastern part of Tishomingo County extensive deposits of chert are found. These chert beds have a thickness at the surface exposed of 40 to 50 ft. and in all probability there is much more beneath. They make a most valuable type of road

material. The beds lie in close proximity to Tennessee River and the material could be quarried, crushed, and loaded in boats by gravity. The chert beds are continuous for several miles along the river.

*Sand.*—The sands of the state show no hatching on the map as these deposits will be found in almost every part of the state. Sand is used in the manufacture of mortar, concrete, and sand-lime brick; for sand-clay roads; and for molding purposes. Practically all formations in the state carry deposits of valuable sands.

Building sands are in reach of every community in the state. In some localities there are banks of clean sand which can be used directly without washing. Sharp sands occur as well as the more rounded and water-worn. There is considerable variation in the size and composition of these sands. Quartz is the predominant mineral, but in some localities the presence of considerable quantities of mica, glauconite, tourmaline, or, rarely, magnetite, may be detected.

There are beds of white sands in the Wilcox and Claiborne formations and these are suitable for use in the manufacture of glass. In the bed of Pearl River at Byram south of Jackson, can be found a good deposit of glass sand. Banks of good-quality sand also occur along the coast in the Port Hudson formation.

Suitable molding sands are found in the state in large deposits in a wide area. These sands contain a small amount of clay, just enough to hold them together; they are usually fine-grained. Some of these sands have been tested for molding, and were found to be excellent for the purpose. Moldings made from these sands are reported as being continuously in use for long periods, and occasionally new sand has to be added because some of it becomes dehydrated and scattered. In other words, the whole mass of sand never becomes dead.

*Silica.*—Deposits of silica in commercial quantities are found in two main localities, in Tallahatchie and Panola Counties, and in Tishomingo County. These deposits contain little or no foreign matter. They can be mined with ease by the open-pit method.

*Stone.*—The deposits of stone, which go to make up the building stones of the state are for the most part the harder limestone and sandstone rocks. In Tishomingo County, in close proximity to the river for transporting, there are deposits of limestone and sandstone, which have sufficient strength and hardness for any type of building. Some of these limestones are crystalline in texture. Deposits have been noted to have 30 to 40 ft. exposed with a possibility that there is a great deal more not exposed. Continuous outcrops of 12 mi. in length have been observed.

In the Claiborne formations are found some sandstones which have properties that would make a high-grade building stone. The Vicksburg limestone area, which extends across the state diagonally in a southeast-direction, contains some limestone which also makes a very good building stone. The Catahoula sandstone, which lies just above the Vicksburg formations, is another source of building stone. In places these sandstones are massive, hard, and resistant to the effects of weathering.

Mississippi is beginning to use more stone in the building of houses and buildings. All the materials and stones are gathered locally. The writer has seen numbers of beautiful houses constructed of native stone. For the most part these stones have come out of the Vicksburg formation. A large percentage of the houses recently constructed in Mississippi are of brick, but the use of stone is increasing.

*Chalk.*—Limestones other than for building purposes are found in the same areas, except for the chalk or chalk rock. This formation is 30 to 40 mi. wide and extends from the Tennessee line diagonally down the state to the Alabama line, a distance of a little over 100 mi. Not all this chalk rock can be used in the manufacture of Portland cement, but in some localities it is sufficiently low in magnesium content to warrant the manufacture of this product. The lime rock in Tishomingo County as well as that of the Vicksburg formation is nearly all of a suitable texture.

*Tripolite.*—The tripolite deposits of Mississippi have been mined in the past, but at present none is being mined. Along Tennessee River is found a very large deposit. The beds are from 15 to 20 ft. thick and are snow-white in character. The material is known to underlie the uplands over several square miles. These deposits have been mined in the past and the tunnels are in good condition now. The roof of the tunnels has sufficient strength to stand up without the use of timbers. The tunnels run several hundred feet in different directions and look like tunnels run into a great snow-bank. Mississippi tripolite has been manufactured into glass and it is reported that the product is as good as Bohemian glass. Tripolite is useful for making dynamite, scouring soap, and fireproofing for safes, steam-pipes and boilers. The deposits are unusually well located for transportation in that they are very near Tennessee River, and the material can be loaded on boats by gravity after it is mined.

*Marl.*—Mississippi has quite extensive beds of marl, which could be used in making various types of fertilizers. These marls have some potash and phosphate; however, they are not rich in these elements. Extensive deposits occur in the Vicksburg limestone and the Selma chalk area.

*Fullers' Earth.*—Fullers' earth is found in several counties of Mississippi in deposits large enough to be of commercial importance. It has been found in Smith, Clarke, Lauderdale, and Newton Counties. The deposits of Newton County furnish a buff-colored, light material, locally called clay stone. This has been found to possess the properties needed for clarifying oils, and holds prospects of becoming a valuable product. So far none of these deposits have been developed.

*Acid-Iron Earth.*—In Jasper, Smith, and Jefferson Counties there has sprung up an industry for the manufacture of products known variously as

"Acidine," "Vicine," etc., medicines made from acid-iron earth, which has some curative properties. The earth contains iron sulphide and is being converted by free oxygen of the water to an iron sulphate, which is the same as copperas. The earth is placed in hoppers made for the purpose and water is poured over it and caught in jars or buckets placed beneath. The water is reddish in color after it has passed through this material.

*Bentonite.*—Bentonite is a recent discovery in the state and yet there are extensive deposits on the surface in the counties of Lowndes, Monroe, Itawamba, Prentiss and Alcorn. In Monroe County beds of bentonite which have a thickness of from 4 to 7 ft., have been observed.

*Bauxite.*—Bauxite has been found in ten or more counties of the northeastern part of Mississippi, and in deposits which would warrant commercial working. The counties where these deposits are found are Tippah, Benton, Union, Pontotoc, Calhoun, Webster, Oktibbeha, Winston, Noxubee and Kemper.

The bauxite is distributed in groups of small separate deposits in a belt from 3 to 5 mi. in width, having in general a northwest-southeast trend about 150 mi. in length. These deposits are nearly all on the surface and have little or no overburden. All the deposits could be mined by the open-pit method.

## Can Proper Lubricants Be Purchased on Specification Only?

(*Continued from page 35*)

the oil is to be used. Anyone can see the folly of buying an oil whose viscosity is a certain amount at 100 deg. F. (38 deg. C.) when the oil is to be used at a somewhat higher or lower temperature.

The viscosity curves of different oils will be found to vary greatly. By that we mean that two oils of the same viscosity at 100 deg. F. (38 deg. C.) may not be anywhere near the same at 150 deg. F. or 175 deg. F. (65 deg. or 79 deg. C.). The viscosity-curve of an oil sometimes remains fairly flat through a temperature rise of 10 deg. or even 25 deg., and then may fall away very rapidly.

2. *Flash Test.*—The flash test of an oil indicates the temperature to which an oil must be heated at a specified rate so as to free enough vapor to flash, or momentarily ignite, when it is subjected to an open flame. In making a flash test the oil is gradually heated and at each few degrees rise of temperature a small flame is applied to the surface of the oil for a few seconds. As soon as the oil flashes, this temperature is taken as its flash-point.

3. *Fire Test.*—The fire test of an oil is the temperature, usually 25 deg. to 75 deg. F. (14 deg. to 42 deg. C.) above the flash-point, at which the oil gives off sufficient vapor to burn steadily if subjected to an open flame. Flash and fire tests are usually given a great deal of prominence when oil is to be subjected to service at high temperatures. Flash and fire tests, however, are taken at atmospheric pressure and an open flame is brought into contact with the oil. In air-compressor lubrication, for example, it is customary to specify an oil of high flash-point, but the oil functions under high pressure, which automatically raises its flash-point, and it never comes into contact with an open flame. In this and many other applications the flash and fire tests made in the laboratory usually mean little so far as the suitability of the oil for a given service is concerned.

4. *Cold Test.*—The cold test of an oil is only useful where the oil is likely to be subjected to low temperatures in operation, which would tend to congeal an oil if it did not have a sufficiently low cold test. The cold test is sometimes called the pour test, and simply indicates the lowest temperature at which the oil will flow. Specifications for refrigerating-machine oils sometimes call for a Pennsylvania crude with a cold test of as low as —5 deg. F. (—20 deg. C.). The lowest cold test obtainable with pure Pennsylvania crude is about 25 deg. F. (—3.9 deg. C.). The only way to lower this is by dewaxing, which makes a very expensive oil. So the man who says he is selling a regular-priced oil made from pure Pennsylvania crude with a cold test much below 25 deg. F. (—3.9 deg. C.) does not know much about oils.

Buying oil to-day is almost as hazardous as horse-trading in the old days. Mistakes are expensive and are very easily made.

A man who is gullible enough to buy oil on physical specifications is almost sure to have much "lame" oil sold to him.

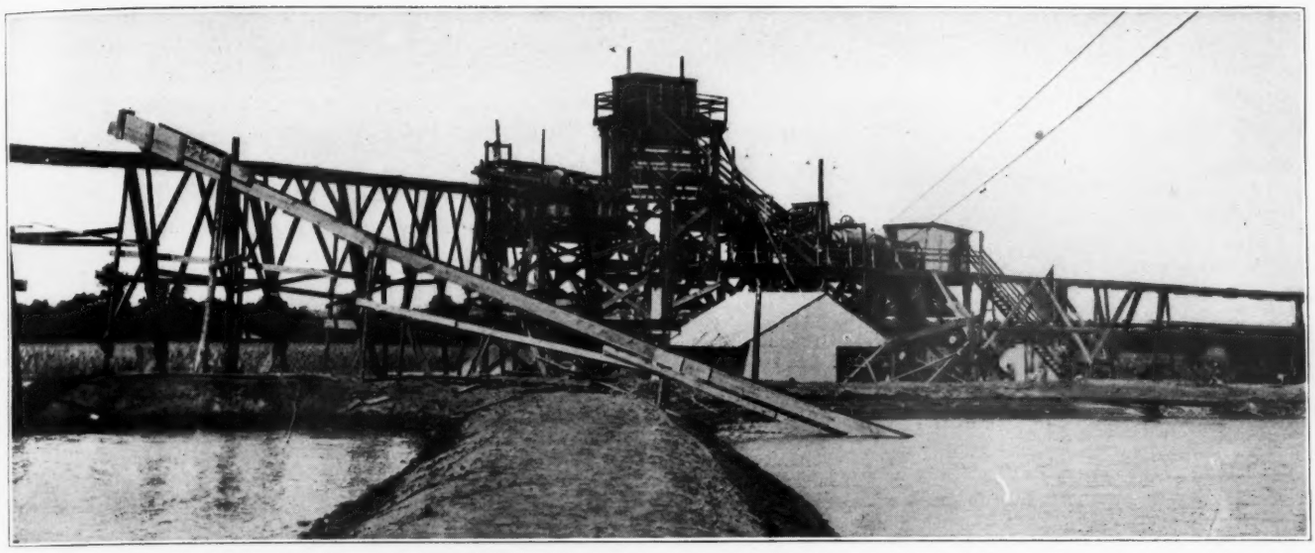
## Trade Commission Makes Report in Probe of Cement Prices

(*Continued from page 40*)

sible without absolute loss in total sales, and the rigidity of prices tends to prevent the expansion of sales in maximum net territory by mill-price reduction. Under such conditions the mill seeks to satisfy its hunger for large volume, intensified often by surplus capacity, by pushing out into less profitable territory in an effort to capture another mill's most profitable business. The result is a swapping of more for less profitable customers at a large net loss to the public in wasteful production and distribution costs.

"The basing-point formula of selling assists in maintaining this rigidity of price at the mill in that it prevents a mill in one market area from dumping its product into another market area at prices below the formula delivered prices of the latter without first reducing its own mill price."

Under Senate Resolution 448, 71st Congress, 3rd Session, which relates to the cement industry, alleged violations of the anti-trust acts are being examined by the commission, and it is expected that a report will be made upon this subject at an early date.



A view of plant and two reservoirs with pump-house visible in foreground. Note arrangements for fluming waste to either pond.

# Important Texas Gravel Producer Finds Temporary Plants Profitable

## Saving in Transportation Costs Biggest Factor in Locating Operations Near Job

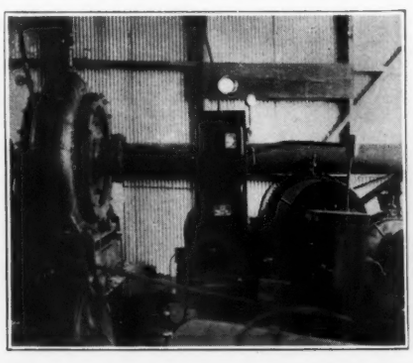
IN the past four years there has been a rapid growth in the development of temporary plants to furnish aggregates for large road, bridge, dam and other large construction projects. Some of these are built and operated by the contractor for the work, but in most cases they are operated by an aggregate producer under an agreement with the contractor. This is true especially in road-construction work, and the number of such plants operating under these conditions is rapidly increasing in the more sparsely settled sections of the country where the cost of aggregates, if delivered from established permanent plants, would be prohibitive.

Gifford-Hill & Co., Inc., one of the largest sand-and-gravel producers in Texas, has been active in this type of work. The most recent plant of this type to be built by the company is located 2 mi. north of Roanoke, Tex., about 28 mi. northwest of Dallas. This plant was built to supply aggregates for concrete-road work in this vicinity. It has a capacity of about 60 tons per hr. and is of interest because of the unusual method of handling aggregates. When the present work is completed the plant will probably be moved to another location.

The plant has concrete foundations and timber superstructure. All the timbers are bolted together so that the plant can be readily taken down and moved to another location. The pump-house has Wheeling corrugated-metal roofing and siding and also serves as a storage-room for parts and supplies. Although classed as a portable plant, this operation is more modern and substantial than many plants intended for permanent operation.

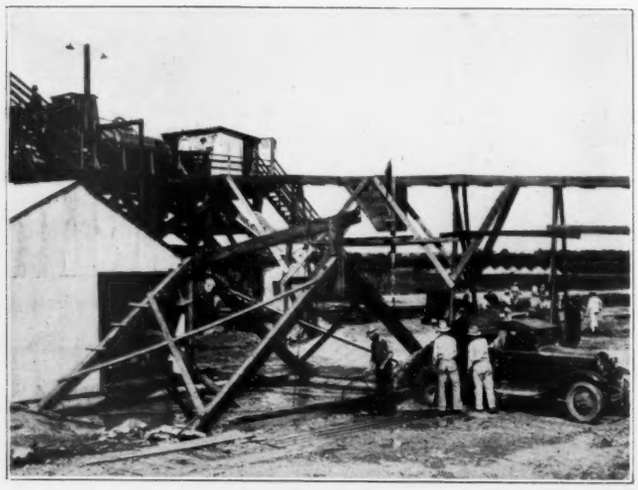
Gravel for the plant is secured from rented deposits on near ranches. The one now furnishing most of the material is about 1 mi. from the plant. Stripping is done with a grader drawn by a Caterpillar 60 tractor. The grader loads into dump-

Shovel loading gravel at one of the pits.



Dredge pump and hoist in pump-house.

Tractor and grader stripping the deposit.



Truck discharging to dredging sump.

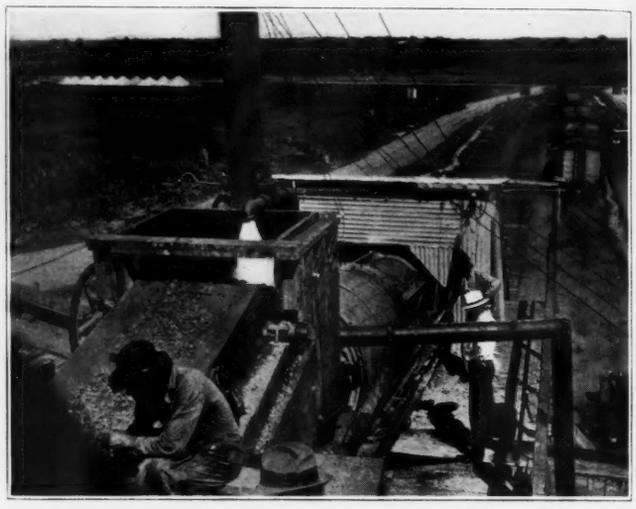
wagons which haul to a waste pile. Hired trucks, used to haul the gravel to the plant, are loaded by a 1¼-cu. yd. P & H gasoline crawler shovel. A 1¼-cu. yd. Northwest gasoline drag-line is being shipped to the plant and will be used for stripping in place of the grader.

The trucks of gravel on arriving at the plant discharge into a timber-lined sump about 30 ft. square and 10 ft. deep. The trucks back on a grilled timber platform at ground level over one end of the sump so that any spilled gravel will drop through into the sump.

The dredge pump which reclaims the material from the sump is located in a small building alongside it. The rubber intake is suspended from a timber A-frame over the sump and is raised and lowered by a Clyde 2-drum hoist driven by a 10-hp. Allis-Chalmers electric motor. The 8-in. Amsco dredge pump is on a concrete foundation and is V-belt driven by a 100-hp. G. E. motor.

The dredge pump discharges through 50 ft. of pipe-line to a steel-lined timber box at the top of the plant which breaks the force of the flow. This discharges over a double-deck sloping stationary wire screen with 1-in. openings on the top deck and ⅜-in. on the bottom deck. The top deck is used only to protect the fine screen from the impact of the large rock.

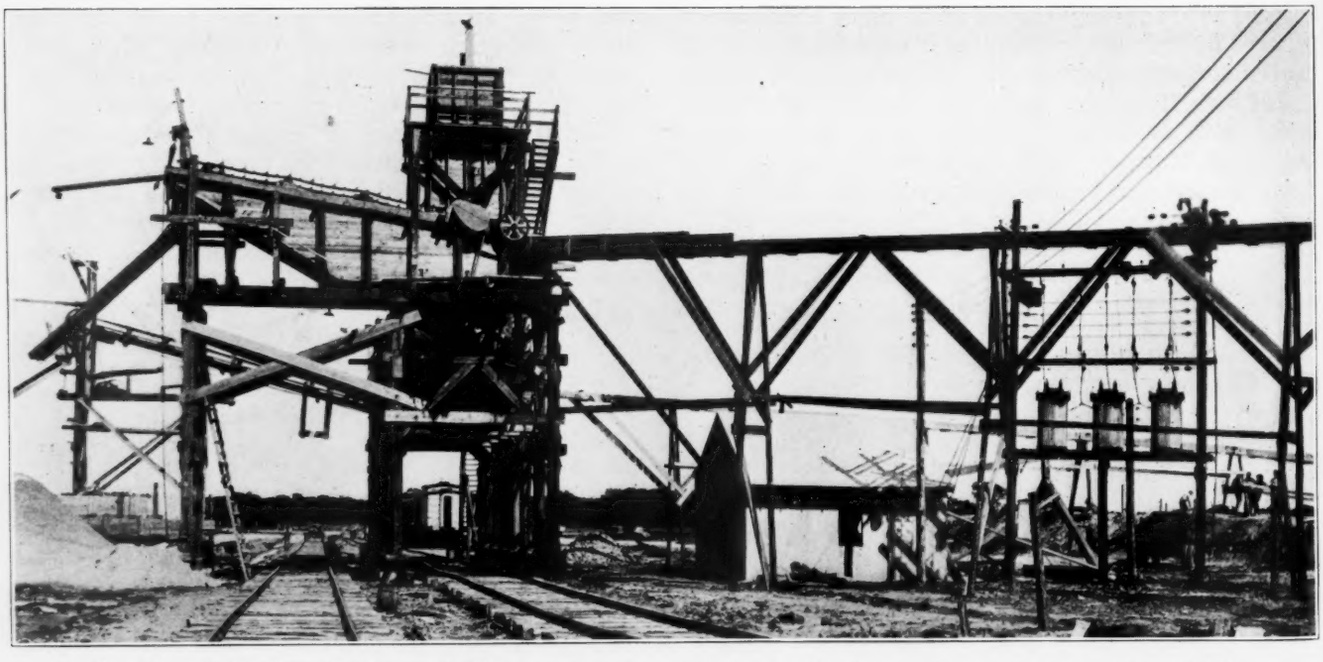
The material passing through the ⅜-in. cloth goes to a Link-Belt sand-drag which is driven by a 15-hp. U. S. electric motor through a Link-Belt silent-chain drive. The sand produced is discharged



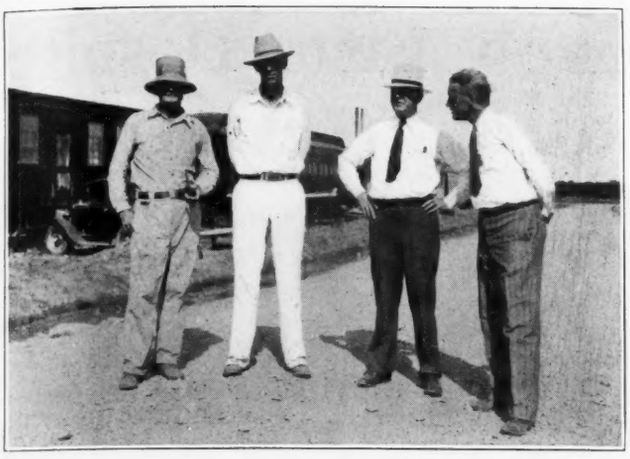
The picking belt-conveyor with revolving screen below.

through chutes, either into cars on a siding below or to stock-piles. Waste water goes to a flume.

The material over ⅜-in. in size is fed from the flat screen to a steel-lined surge hopper. This discharges through a gate, which controls the rate of feed, to a 36-in. inclined belt-conveyor on 20-ft. centers which serves as a clay-picking belt. The conveyor discharges to a 40-in. by 20-ft. Telsmith revolving screen, which has 1-in. and 3-in. round



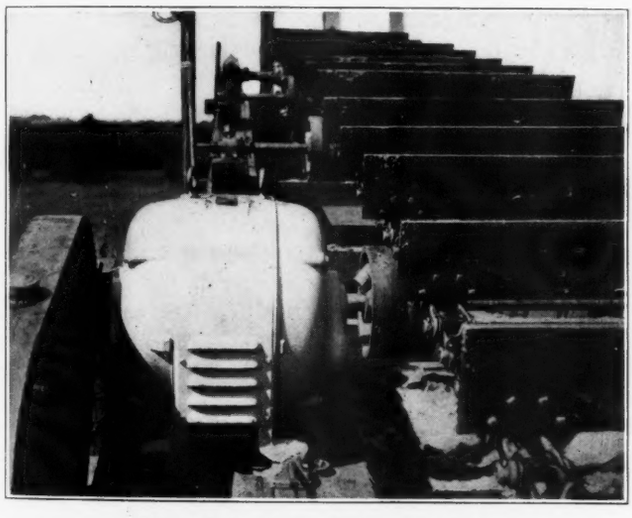
Another view of the plant showing stock-piling arrangements, sand-drag, car-loading tracks, pump-house and transformers.



Group of plant heads and company officials. J. R. Hill, vice-president, second from right.

perforations on the main barrel and a 3/8-in. slotted outer jacket. The oversize (over 3-in.) is chuted to a waste pile, while the fines (3/8-in. minus) go with the wash-water to a flume, where the pea gravel is settled out and chuted to a stock-pile.

The gravel (3/8-in. to 3-in.) is discharged either directly into cars or to a short stock-piling conveyor, which discharges through a movable chute



Silent-chain drive of the sand-drag.

to stock-pile storage alongside the plant so that the gravel can be readily rehandled into cars for shipment. The sizing screen is V-belt and gear-and-chain driven by a 15-hp. U. S. motor. The picking conveyor is chain-driven from the screen and the stock-piling conveyor is chain-driven by a small electric motor.

Water for plant operation is pumped from a stream near the plant into two large earthen reservoirs from which it flows by gravity to the other reservoir. Water from only one is used at a time, while the other is used as a settling pond for waste water from the plant. A flexible-chute arrangement makes this possible.

The main office of Gifford-Hill & Co., Inc., is at 412 Mercantile Bldg., Dallas, Tex. The officers are: P. W. Gifford, president; J. R. Hill, vice-president; H. Whyte, secretary; H. M. Lacy, treasurer; and Jerry Higgs, chief engineer. The firm operates 11 gravel plants in Texas and Louisiana.

## Resumption of Road Building Means Better Times for Many

They're at it again—the road builders. Stringing their pipe-lines and driving their grade stakes, subgrades are being made ready for the placing of concrete. Soon the mixers will start rumbling and more miles of pavement will go down to make travel easier, quicker and more economical for the users of motor vehicles.

Renewal of highway work this spring, while on a somewhat reduced scale, brings cheer to the thousands of men and their families who depend on road building and its allied industries as a means of livelihood. And merchants who furnish the bread and flour, and shoes and coal which these individuals buy—often on credit—feel a returning optimism and see better times ahead. Concrete-road building creates activity in cement plants, stone quarries, sand-and-gravel pits, steel-fabricating plants, factories which make road-building equipment and contractors' organizations. It makes more jobs through heavy demands for transportation and coal.

When construction stops either for seasonal halting of work or because road money collected in gasoline taxes is diverted into unrelated channels, the effect in added unemployment is apparent. Then it is that the importance of the road industry as an employment factor is recognized.

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## Sulphur Production Shrinks in 1931 to 2,128,930 Long Tons

Production, shipments, and exports of sulphur in 1931 showed marked decreases in comparison with 1930, according to the United States Bureau of Mines, Dept. of Commerce. Sulphur production amounted to 2,128,930 long tons, a decrease of 17 per cent from the record output of 2,558,981 tons in 1930. Shipments declined from 1,989,917 tons, valued at about $35,800,000, in 1930, to 1,376,526 tons, valued at $24,800,000, in 1931, or 31 per cent. both in quantity and in value, and were the smallest recorded since 1922. Stocks of sulphur at the mines increased steadily and amounted to 3,250,000 tons on Dec. 31, 1931, a net gain of 753,000 tons for the year. These stocks were approximately 250,000 tons higher than the previous record stocks on hand at the mines at the end of 1923.

As in 1930, Texas was the only sulphur-producing state. The properties that contributed to this production were those of the Duval Texas Sulphur Co. at Palangana Dome, Benavides, Duval County; Freeport Sulphur Co. at Bryan and Hoskins Mounds, Freeport, Brazoria County; and the Texas Gulf Sulphur Co. at Long Point Dome, Long Point, Ft. Bend County, Big Hill Dome, Gulf, Matagorda County, and at Boling Dome, Newgulf, Wharton County.

The average quoted price for sulphur was unchanged at $18 a ton f. o. b. mines throughout the year. Open prices were $1 to $3 a ton higher, and prices for sulphur exported were given as $22 a ton f.a.s. Atlantic ports.

# Gypsum Prices Relatively Firm Despite Recession in New Construction

## Production in 1931 Shows Marked Drop; Only 25 Per Cent. of Capacity Utilized

WITH the continued recession in building construction throughout the United States, the gypsum industry was able to utilize only about 25 per cent. of its existing plant capacity in 1931. According to the quarterly returns as shown in the accompanying table, the amount of crude gypsum mined during 1931 was about 2,519,000 short tons, or an estimated decrease of 27 per cent. from the output during the previous year. The amount of domestic and imported rock sold as crude gypsum in 1931 was 775,242 tons, while the amount of calcined gypsum produced from domestic and imported rock was 1,856,245 tons.

Plant prices were maintained at a fairly uniform figure compared to 1930, with no serious evidence of disastrous price-cutting, although there were indications that some producers had absorbed the recent increase in freight rates when quoting prices on gypsum products.

Developments in the industry in the United States during the year were confined largely to the improvement of previous products yet, as a result of considerable research work undertaken by several producers, a number of new products were introduced. In this field of effort one company alone developed at least three times as many new products during 1931 as in any previous year. Among new products brought out are: (1) a product of unusual hardness used for mastic floors, (2) tongue-and-groove floor tile over which any form of floor topping may be used, (3) a plaster-board faced with real wood veneer for paneling, and (4) an insulating tile-board. One company also brought out a panel plaster-board covered with either wood veneer or paper printed to resemble wood. With the exception of the panel plaster-board, these new products were in most cases of minor importance as regards tonnage. A large potential market, however, was opened for finely-ground crude gypsum and dead-burned gypsum. These materials are used as fillers in paper and it is estimated that the paper industry represents a market for approximately 500,000 tons annually.

No plant developments of importance were made in this country, but two plants went into operation in Canada during the year. The United States Gypsum Co. improved two of its plants; plant gas-burning equipment replaced coal-burners at Fort Dodge, Ia.; and grinding equipment for the manufacture of terra alba was installed at Alabaster, Mich. The Best Bros. Keene's Cement Co. at Sun City, Kan., abandoned its quarry during the year and confined all production to a single level, room-and-pillar mine. The Arizona Gypsum Plaster Co. opened a new open-cut mine acquired during the year.

In Canada a new gypsum wall-board plant was opened at Hillsborough, N. B., by the Canadian Gypsum Co., which also put into operation on Nov. 1, 1931, a new plant at Hagersville, Ont. The latter unit includes a mine, modern calcining mill, warehouse, board plant and block plant.

The following operators, coöperating with the U. S. Bureau of Mines, furnished the figures included in the statement for the fourth quarter: American Gypsum Co., Arizona Gypsum Plaster Co., Atlantic Gypsum Products Co., Atlas Gypsum Products Corp., Beaver Products Company of Virginia, Inc., Best Brothers Keene's Cement Co., Blue Diamond Corp., Certain-teed Products Corp., Colorado Portland Cement Co., Connecticut Adamant Plaster Co., Ebsary Gypsum Co., Grand Rapids Plaster Co., Gulf Gypsum Co., Jumbo Plaster & Cement Co., Hawkeye Gypsum Products Co., Lycoming Calcining Co., Michigan Gypsum Co., National Gypsum Co., National Keene Cement Co., Newark Plaster Co., Oakfield Gypsum Products Corp., Pacific Portland Cement Co., Paoli Gypsum Mine (A. P. Shepard), Phoenix Gypsum Co., Inc., Chas. W. Priddy & Co., Inc., Regan Bros., Rutland Fire Clay Co., Standard Gypsum Co., Texas Cement Plaster Co., Three Forks Portland Cement Co., Universal Gypsum & Lime Co., United States Gypsum Co., Victor Plaster, Inc., and Wasem Plaster Co.

QUARTERLY PRODUCTION, IMPORTS AND SALES OF GYPSUM AND GYPSUM PRODUCTS IN THE UNITED STATES IN 1931, AS REPORTED BY OPERATORS

| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|---|---|---|---|---|
| Number of operators reporting | 33 | 35 | 34 | 34 |
| Crude gypsum mined, *short tons* | 545,018 | 851,082 | 640,068 | 482,930 |
| Crude gypsum imported (as reported by importers), *short tons* | (a) | 156,448 | 303,784 | 148,536 |
| Crude gypsum sold (domestic and imported), *short tons* | 126,543 | 262,841 | 234,938 | 150,920 |
| Calcined gypsum produced from domestic and imported rock, *short tons* | 444,116 | 578,621 | 493,552 | 339,956 |
| Calcined gypsum products sold from domestic and imported rock: | | | | |
| For pottery, terra cotta, plate glass, mixing plants, etc, *short tons* | 54,921 | 51,993 | 44,010 | 32,797 |
| Keene's cement, *short tons* | 7,894 | 7,658 | 6,990 | 4,736 |
| Neat, wood fiber, sanded, gaging, finished plasters, etc, *short tons* | 302,237 | 410,942 | 373,808 | 250,327 |
| Wall-board, *sq. ft.* | 88,569,846 | 105,129,361 | 72,122,523 | 62,795,565 |
| Plaster-board and lath, *sq. ft.* | 53,873,521 | 65,925,953 | 56,525,903 | 41,148,058 |
| Partition tile, *sq. ft.* | 6,052,441 | 7,016,019 | 5,315,636 | 3,435,911 |
| Roof tile, *sq. ft.* | (a) | (a) | (a) | 308,446 |
| Other tile, *sq. ft.* | (a) | (a) | (a) | (a) |
| Other calcined gypsum sold, *short tons* | 3,427 | 3,376 | 3,313 | 2,093 |

(a) Fewer than three operators reporting.

# MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is selected without significance as to current events or the position of the individual in the industry.

**EDWARD H. PARRY**
Safety Director
Glens Falls Portland Cement Co.
Glens Falls, N. Y.

# Coming Events

**April 6, 1932. Chicago, Ill.** Tenth Annual Midwest Safety Conference. G. G. Traver, manager, Chicago Safety Council, 130 N. Wells St., Chicago.

**April 14, 1932. St. Louis, Mo.** Monthly meeting, St. Louis Quarrymen's Assn., Forest Park Hotel. E. J. McMahon, exec. sec., 4063 Forest Park Blvd., St. Louis, Mo.

**April 19-21, 1932. Columbus, O.** Fifth All-Ohio Safety Congress. T. P. Kearns, Ohio Industrial Commission, Columbus.

**May 5, 1932. Newark, N. J.** Eighth Annual Eastern Safety Conference. F. M. Rosseland, secretary, Newark Safety Council.

**May 19, 1932. Erie, Pa.** Seventh Annual Northwestern Pennsylvania Safety Conference. S. M. Lippincott, secretary, Erie Safety Council.

**May 24-25, 1932, Cleveland, O.** Annual Convention, National Lime Assn. Norman G. Hough, president and general manager, 927 Fifteenth St. N. W., Washington, D. C.

**June 20-24, 1932. Atlantic City, N. J.** Annual meeting of American Society for Testing Materials. C. L. Warwick, secretary-treasurer, 1315 Spruce St., Philadelphia, Pa.

**October 3-7, 1932. Washington, D. C.** Twenty-first Annual Safety Congress, National Safety Council. W. H. Cameron, secretary, 20 N. Wacker Drive, Chicago, Ill.

# Pumpings from the Old Pit

*Excerpts from the old files of* PIT AND QUARRY *reveal many interesting sidelights on the activities of the pits, quarries and plants of former days. These are printed in this column each issue.*

## Fifteen Years Ago

WORK was started on the new $150,000 crushed-stone plant and quarry of the Lehigh Stone Co. at Kankakee, Ill. The new quarry was being opened on a 160-acre tract adjoining the old deposits which the company had worked for many years. M. J. Edgeworth was head of the concern. New tracks were also being laid to connect with the main line of the Illinois Central Railroad.

* * *

The LeRoy Lime & Crushed Stone Co. was formed at LeRoy, N. Y. The company's plant was scheduled to begin operating May 1, 1917. George Gruhl of Dundas, Ontario, was engaged as superintendent. Directors of the company were: John Heimlich, Margaret Heimlich and I. Leonard Heimlich.

## Ten Years Ago

PREPARATIONS were being made to turn out the first barrel of cement at the new plant of the Signal Mountain Portland Cement Co., located near Chattanooga, Tenn., at the foot of the historic mountain which gave the plant its name. The first unit was planned to have a daily capacity of 1,250 bbl. Four such units were in the various stages of construction. John L. Senior was president of the company.

* * *

F. W. Cornell, head of the Red Bank Gravel Co. at Cincinnati, was planning the installation of concrete chutes from the storage bins at the plant for diversion of surplus materials to ground storage.

* * *

Extensive improvements were being made at the plant of the Hudson River Trap Rock Co. at Marlborough, N. Y. Over $200,000 was being invested in crushers, shovels, locomotives and cars.

* * *

Iowa crushed-stone operators formed a state organization known as the Iowa Stone Producers' Assn. Paul L. Nauman was elected president; Stanley M. Hand, vice-president; and R. N. VanWinkle, secretary.

## Five Years Ago

PLANS were being made for the ninth annual convention of the National Lime Assn., to be held May 17-19, 1927, at White Sulphur Springs, W. Va.

* * *

Harry V. Croswell, manager of the Batavia, N. Y., plant of the United States Gypsum Co., was promoted to the position of manager of mines for the entire company.

* * *

F. H. Powell was elected president of the Southwestern Portland Cement Co., succeeding the Carl Leonardt who had died a short time before.

* * *

The Columbia Sand & Gravel Co. was completing the construction of a new sand-and-gravel plant at Washington, D. C. The new operation had a scheduled capacity of 200 tons per hr. W. H. Jordan, engineer for the company, was in charge of construction.

* * *

Two new lime kilns were added to the four already in service at the plant of the Riverside Lime & Stone Co. at Lyons, Ill.

## Issues Monographs on Industrial Lubricants

Beginning in April, the Standard Oil Co. (Indiana) will publish each month a technical monograph on the lubrication of some type of equipment. The company states it has found that many plant men have expressed the desire to have specific authoritative information on the proper lubrication of various types of machinery.

The plan is to go through the whole line of the more important industrial equipment, making each lubrication discussion simple, brief and informative. No recommendations for any particular brands of lubricants will be made. The company feels such statements might savor of prejudice which will defeat the purpose of giving unbiased technical information. Requests for these monographs should be addressed to the technical division, 910 South Michigan Ave., Chicago.

The Chicago Pneumatic Tool Co. announces the appointment of the H. O. Penn Machinery Co., New York, as sales agent in the territory covered by that firm. The products to be handled include portable and stationary compressors, rock drills, pavement breakers and similar pneumatic equipment.

# New Incorporations

CENTURY MASONRY CEMENT CO., Wilmington, Del. 2,500 shares preferred and 20,000 shares common. Resident agent, The Corporation Trust Co., 100 W. 10th St.

PRODUCERS SAND & GRAVEL CO., Amarillo, Tex., S. F. Sullenberger, F. L. Pedersen and S. M. Sullenberger.

ORLAND CRUSHED STONE CO. OF DELAWARE, Philadelphia, Pa. 10,000 shares common. Resident agent, J. Elwood Teat, Dover, Del.

STOCKTON SAND & CRUSHED ROCK CO., Stockton, Cal. Capital, $50,000. Edward M. Foy, Ralph L. Foy and Mary S. Foy.

SOUTHERN ROCK ASPHALT CO., St. Louis, Mo. Capital, $250,000. G. A. Brown, 6653 Berthold St.

NATIONAL PORTLAND CEMENT CO., Brodhead, Pa. Capital, $2,700,000. Robert H. Anderson, Ambler, pres.; Fred B. Franks, Allentown, vice-pres., gen. mgr.; Louis Rafetto, Philadelphia, treas.

# Personal Mention

Will **L. Ellerbeck**, manager of the Nephi Plaster & Manufacturing Co., the Utah Lime & Stone Co. and the Utah Stucco Products Co. with headquarters in Salt Lake City, has been elected to represent the cement and plaster interests of his state as a director of the newly-organized Utah Building & Construction Congress. This organization will foster new public construction during times of depression, and also make an effort to encourage more winter construction so as to eliminate, as far as possible, the seasonal unemployment features of the building industry.

**George Paull Torrence** was elected president of the Link Belt Co. at the annual meeting of directors held in March. Mr. Torrence has been with Link Belt in various capacities for 21 years. He is a graduate of Purdue university in the class of 1908. He became head of merchandise and chain sales of the company's western division in 1915. He had been connected with the Indianapolis operations since 1920. He was made a vice-president in 1928.

**E. Gwynn Robinson** has been named representative in the New York metropolitan area for the Cleveland Rock Drill Co., and the Le Roi Co. of Milwaukee, makers of gasoline engines and air compressors. Mr. Robinson is well known among plant operators. For several years he was a member of the firm of the H. O. Penn Machinery Co., of New York, N. Y.

**E. H. McEuen**, manager of the plant of the Valley Lime Co., at Lindsay, Cal., reports that plant operations have been resumed. At least one kiln will remain in operation throughout the spring and summer, according to Mr. McEuen.

**A. E. Ballin**, formerly president of McIntosh & Seymour Corp., has become vice-president of the Nordberg Manufacturing Co., Milwaukee, Wis. Mr. Ballin will be in charge of sales and engineering. Before becoming head of the McIntosh & Seymour organization, he served as manager of the oil- and gasoline-engine department of the Worthington Co.

**R. K. Brewster**, manager of the Port Ewen, N. Y., blasting-cap plant of the Hercules Powder Co., has been transferred to Wilmington, Del. Mr. Brewster will have charge of the manufacture of blasting and electric-blasting caps from the company's home office. **E. P. Rochford** has been appointed superintendent of the Port Ewen plant.

**Fred W. Longan**, president of the American National Bank of Lincoln, Ill., has been elected vice-president and treasurer of the Lincoln Sand & Gravel Co.

**F. G. Holdinghausen** of Los Angeles has been appointed superintendent of the Holmes Lime & Cement Co., of Felton, Cal., succeeding **George N. Ley**, who resigned. New grinding equipment, conveyors, kilns and an office building are to be erected shortly, according to Mr. Holdinghausen.

**James Orr**, of San Diego, Cal., and **T. F. Wyly**, of Boise, Ida., have organized the Great White Sands Gypsum Co., Inc., and will establish operations near Alamogordo, N. M., running a spur track out to its raw-material supply, and will establish a plant near that point with an initial capacity of 300 tons per day. Mr. Wyly will have charge of sales for the company, and is at present located in Alamogordo. The capital stock of this company is $500,000, all of which has been issued.

**R. W. Cornelisen** has been named field sales manager of the Northwest Engineering Co., Chicago, Ill., builders of shovels, cranes, drag-lines, etc. Mr. Cornelisen is a graduate of civil engineering from Illinois. In 1919, he entered the service of the Lakewood Engineering Co. at Cleveland. Shortly after going with the company he became manager of the construction-equipment department, a position he held until 1930. He was then made assistant general sales manager of both the Lakewood Co. and the Jaeger Co.

**Edward B. Fallon** and **Sidney Ogren**, both of Jamestown, N. Y., have formed the F. & O. Gravel Co., Inc. The new firm plans to expend $15,000 for the operation of a sand-and-gravel plant near Jamestown in the near future.

**Herbert Helwig**, superintendent of the Metaline, Wash., plant of the Lehigh Portland Cement Co., accompanied by Mrs. Helwig, has sailed for New York via the Panama Canal. While in the east, Mr. Helwig will confer with officials of his company at Allentown, Pa. The Helwigs will return to their home in the Pacific northwest about May 1.

**B. F. Morris**, for many years engaged in the building-materials business, has been elected president of the Pioneer Sand & Gravel Co., of Seattle, Wash.

**D. D. Barnes**, formerly sales manager for Smith Engineering Works, has joined the sales staff of the H. O. Penn Machinery Co., New York, N. Y.

## Obituary

**James A. Hagan**, 64 years old, secretary and treasurer of the Indian Hill Stone Co., of Chicago, died March 25 at his home in Chicago. He was a native of that city and had been in the construction business for many years. The widow and four children survive.

**E. T. Walker**, age 44, owner of the Limestone Service Co., was killed and three workers, **James Wilcher**, **John Ratliff** and **Elwood Brackett**, also met their deaths in a cave-in following a blast at the company's quarry near Centerville, O., recently. The men were loading a truck with stone beneath a ledge of the quarry when the overhanging rock gave way without warning.

**John T. Clancy**, an executive of Worthington Pump & Machinery Corp., died suddenly of a heart attack, March 9, while lecturing at the Engineers' Club, New York City, before a meeting of the American Society of Mechanical Engineers. In 1919 he joined the Worthington organization and in 1923 became assistant manager of oil and gas engine sales, with headquarters at Buffalo, N. Y., the position he had held until his death. In July, 1931, his headquarters were moved to the Harrison, N. J., plant. He is survived by his wife, Mary F. Clancy. Interment was at Arlington cemetery.

**George Nicholson**, vice-president of the Vulcan Iron Works, died recently at his home in Wilkes-Barre, Pa.

**Harry F. Ostrander**, 57 years old, died at a Seattle, Wash., hospital recently. Mr. Ostrander was president of the Pioneer Sand & Gravel Co., one of the largest producers of aggregates and pre-mixed concrete in the state of Washington and was well known throughout the industry. Besides his widow, he is survived by five children.

**Theodore J. Schott**, president of the Wausau Sand & Gravel Co., of Wausau, Wis., died recently following a four-months' illness. Death was due to heart disease. He was 53 years old and had lived in Wisconsin all his life, having been born at Appleton. In addition to heading the gravel company, Mr. Schott was vice-president of the Wausau Concrete Co., and one of the organizers of the Wausau Iron Works.

# Latest Portland-Cement Statistics

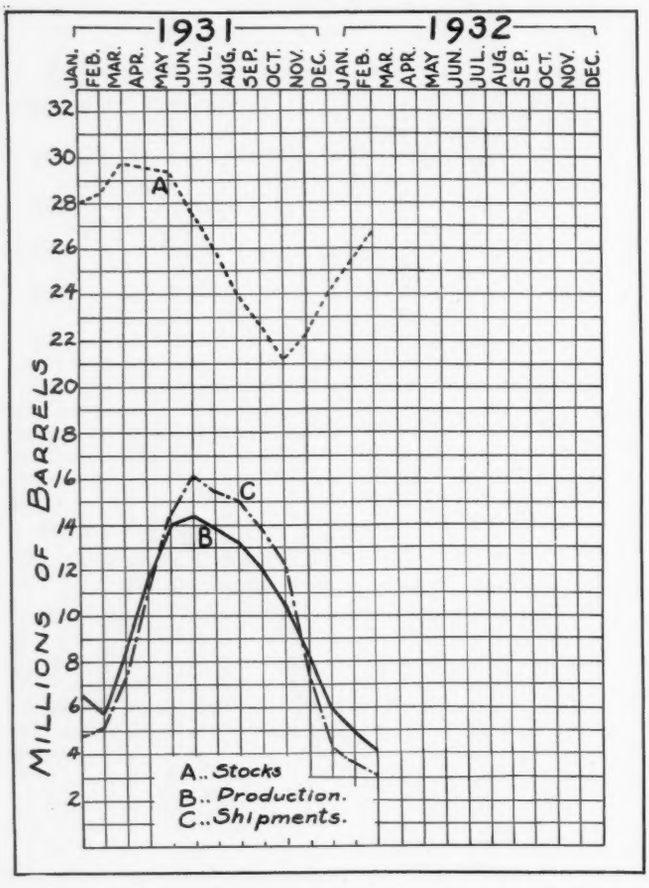

1931
1932
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC.
JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC.
MILLIONS OF BARRELS
32 30 28 26 24 22 20 18 16 14 12 10 8 6 4 2
A
B
C
A.. Stocks
B.. Production.
C.. Shipments.

Chart showing monthly production, shipments and stocks on hand at end of month, from January, 1931, to February, 1932.

THE Portland cement industry in February, 1932, produced 3,971,000 bbl., shipped 3,118,000 bbl. from the mills, and had in stock at the end of the month 26,631,000 barrels. Production of Portland cement in February, 1932, showed a decrease of 32.9 per cent. and shipments a decrease of 38.5 per cent. as compared with February, 1931. Portland cement stocks at the mills were 6.9 per cent. lower than a year ago.

In the statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 165 plants both at the close of February, 1932, and of February, 1931. The estimates include increased capacity due to extensions and improvements during the period.

**DISTRIBUTION OF CEMENT**

| Shipped to— | December | | January | |
|---|---|---|---|---|
| | 1930 | 1931 | 1931 | 1932 |
| Alabama | 77,946 | 21,963 | 88,798 | 29,065 |
| Alaska | 142 | 25 | 11 | 132 |
| Arizona | 30,171 | 15,640 | 36,015 | 12,426 |
| Arkansas | 63,553 | 17,112 | 54,904 | 19,588 |
| California | 704,699 | 322,270 | 580,888 | 371,260 |
| Colorado | 19,474 | 22,047 | 20,937 | 13,598 |
| Connecticut | 68,997 | 51,564 | 40,081 | 37,618 |
| Delaware | 12,883 | 11,461 | 10,916 | 13,150 |
| District of Columbia | 59,861 | 77,875 | 53,960 | 59,606 |
| Florida | 60,233 | 33,081 | 64,038 | 27,586 |
| Georgia | 86,898 | 83,222 | 83,687 | 100,950 |
| Hawaii | 19,770 | 12,473 | 24,971 | 16,983 |
| Idaho | 4,829 | 3,286 | 4,465 | 2,359 |
| Illinois | 247,845 | 193,244 | 195,146 | 103,901 |
| Indiana | 80,190 | 72,495 | 79,310 | 48,366 |
| Iowa | 40,965 | 34,916 | 30,333 | 22,943 |
| Kansas | 78,186 | 86,455 | 70,951 | 27,495 |
| Kentucky | 54,631 | 49,417 | 56,581 | 44,852 |
| Louisiana | 130,600 | 77,914 | 133,695 | 77,633 |
| Maine | 26,759 | 11,145 | 8,263 | 6,847 |
| Maryland | 84,223 | 133,256 | 48,532 | 87,662 |
| Massachusetts | 153,583 | 110,738 | 106,524 | 87,756 |
| Michigan | 194,610 | 119,925 | 174,367 | 92,394 |
| Minnesota | 64,412 | 35,166 | 46,987 | 31,018 |
| Mississippi | 32,986 | 5,820 | 37,644 | 14,040 |
| Missouri | 188,762 | 178,052 | 167,209 | 77,383 |
| Montana | 9,612 | 3,697 | 9,502 | 3,494 |
| Nebraska | 21,890 | 25,655 | 16,464 | 6,897 |
| Nevada | 1,916 | 12,587 | 2,455 | 10,308 |
| New Hampshire | 12,673 | 9,272 | 6,586 | 7,667 |
| New Jersey | 259,936 | 212,095 | 135,679 | 165,341 |
| New Mexico | 12,929 | 9,934 | 12,200 | 6,292 |
| New York | 867,187 | 760,928 | 653,705 | 590,166 |
| North Carolina | 42,274 | 35,452 | 30,352 | 37,779 |
| North Dakota | 2,352 | 1,258 | 2,737 | 942 |
| Ohio | 238,538 | 194,959 | 188,631 | 161,775 |
| Oklahoma | 135,784 | 121,420 | 115,140 | 81,230 |
| Oregon | 53,936 | 16,332 | 36,696 | 26,097 |
| Pennsylvania | 431,241 | 298,610 | 323,776 | 251,407 |
| Porto Rico | 6,918 | 8,525 | 620 | 2,725 |
| Rhode Island | 20,270 | 26,601 | 13,249 | 22,151 |
| South Carolina | 132,992 | 52,483 | 170,545 | 33,652 |
| South Dakota | 7,187 | 8,749 | 6,533 | 3,721 |
| Tennessee | 74,077 | 44,322 | 65,246 | 36,629 |
| Texas | 339,964 | 223,504 | 327,904 | 255,469 |
| Utah | 4,271 | 6,861 | 6,075 | 6,730 |
| Vermont | 2,678 | 5,602 | 2,869 | 2,937 |
| Virginia | 77,370 | 78,200 | 61,804 | 64,365 |
| Washington | 185,135 | 50,654 | 110,948 | 45,904 |
| West Virginia | 56,245 | 50,176 | 52,512 | 45,752 |
| Wisconsin | 62,793 | 73,102 | 66,531 | 54,214 |
| Wyoming | 3,028 | 2,661 | 4,854 | 1,261 |
| Unspecified | 427 | 0 | 25,533 | 15,671 |
| | 5,650,831 | 4,114,201 | 4,668,359 | 3,367,187 |
| Foreign countries | 37,169 | 27,799 | 23,641 | 25,813 |
| Total shipped from cement plants | 5,688,000 | 4,142,000 | 4,692,000 | 3,393,000 |

**EXPORTS OF HYDRAULIC CEMENT BY COUNTRIES IN JANUARY, 1932**

| Exported to— | Barrels | Value |
|---|---|---|
| Canada | 1,319 | $ 4,102 |
| Central America | 23,196 | 36,628 |
| Cuba | 1,910 | 3,980 |
| Other West Indies | 170 | 396 |
| Mexico | 914 | 2,610 |
| South America | 6,852 | 23,450 |
| Other countries | 2,343 | 11,818 |
| | 36,704 | 82,984 |

**IMPORTS OF HYDRAULIC CEMENT BY COUNTRIES AND BY DISTRICTS, IN JANUARY, 1932**

| Imported from | District into which imported | Barrels | Value |
|---|---|---|---|
| Belgium | Porto Rico | 1,264 | $ 1,750 |
| Cuba | Porto Rico | 4,295 | 6,015 |
| Denmark | Porto Rico | 6,012 | 5,097 |
| France | New York | 211 | 755 |
| Germany | Philadelphia | 293 | 149 |
| Japan | Hawaii | 2,000 | 1,982 |
| United Kingdom | New York | 300 | 900 |
| | Total | 14,375 | 16,648 |

**RELATION OF PRODUCTION TO CAPACITY**

| | February | | January | December | November |
|---|---|---|---|---|---|
| | 1931 (*per cent.*) | 1932 (*per cent.*) | 1932 (*per cent.*) | 1931 (*per cent.*) | 1931 (*per cent.*) |
| The month | 29.4 | 18.7 | 22.0 | 26.4 | 37.2 |
| The 12 months ended | 59.7 | 45.2 | 45.9 | 46.5 | 44.4 |

## PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY MONTHS, IN 1931 AND 1932 (*thousands of barrels*)

| Month | Production | | Shipments | | Stocks at End of Month | |
|---|---|---|---|---|---|---|
| | 1931 | 1932 | 1931 | 1932 | 1931 | 1932 |
| January | 6,595 | 5,026 | 4,692 | 3,393 | 27,759 | 25,778 |
| February | 5,920 | 3,971 | 5,074 | 3,118 | 28,612 | 26,631 |
| March | 8,245 | ..... | 7,192 | ..... | 29,676 | ..... |
| April | 11,245 | ..... | 11,184 | ..... | 29,715 | ..... |
| May | 14,010 | ..... | 14,200 | ..... | 29,554 | ..... |
| June | 14,118 | ..... | 16,077 | ..... | 27,602 | ..... |
| July | 13,899 | ..... | 15,545 | ..... | 25,934 | ..... |
| August | 13,549 | ..... | 15,172 | ..... | 24,313 | ..... |
| September | 12,092 | ..... | 13,671 | ..... | 22,736 | ..... |
| October | 10,762 | ..... | 12,360 | ..... | 21,218 | ..... |
| November | 8,161 | ..... | 7,156 | ..... | 22,219 | ..... |
| December | 5,974 | ..... | 4,142 | ..... | 24,098 | ..... |
| Totals | 124,570 | ..... | 126,465 | ..... | ..... | ..... |

## PRODUCTION AND STOCKS OF CLINKER, BY DISTRICTS, in FEBRUARY, 1931 and 1932 (*thousands of barrels*)

| District | Production | | Stocks at end of Month | |
|---|---|---|---|---|
| | 1931 | 1932 | 1931 | 1932 |
| Eastern Pa., N. J., and Md | 1,947 | 1,531 | 1,665 | 1,156 |
| New York and Maine | 326 | 443 | 1,078 | 722 |
| Ohio, Western Pa., and W. Va | 580 | 426 | 1,464 | 1,116 |
| Michigan | 380 | 200 | 1,542 | 817 |
| Wis., Ill., Ind., and Ky | 891 | 904 | 1,558 | 1,111 |
| Va., Tenn., Ala., Ga., Fla., and La | 749 | 314 | 872 | 808 |
| Eastern Mo., Ia., Minn., and S. Dak | 896 | 341 | 727 | 442 |
| W. Mo., Neb., Kan., Okla., and Ark | 388 | 320 | 791 | 807 |
| Texas | 292 | 219 | 348 | 239 |
| Colo., Mont., Utah, Wyo., and Idaho | 160 | 35 | 276 | 190 |
| California | 706 | 408 | 1,141 | 1,623 |
| Oreg. and Wash | 158 | 35 | 484 | 373 |
| Totals | 7,473 | 5,176 | 11,946 | 9,404 |

## PRODUCTION, SHIPMENTS, AND STOCKS OF FINISHED PORTLAND CEMENT, BY DISTRICTS, IN FEBRUARY, 1931 AND 1932, AND STOCKS IN JANUARY, 1932 (*thousands of barrels*)

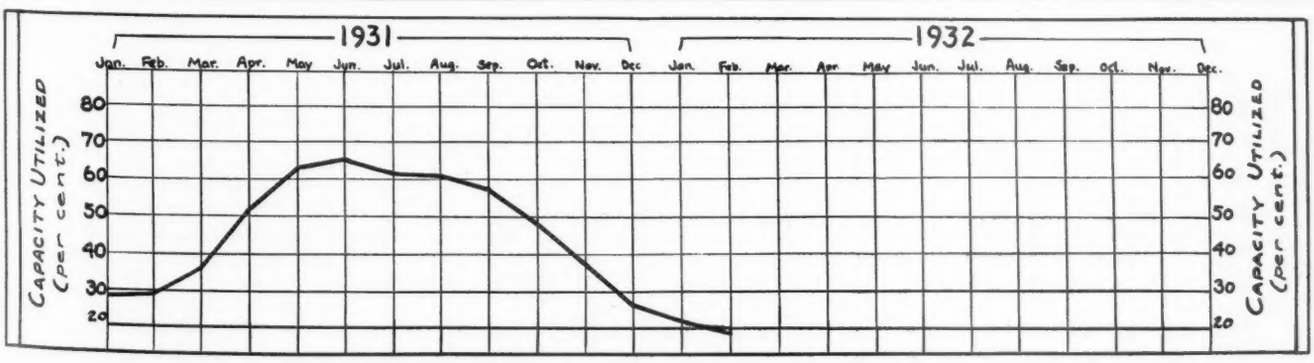
| District | February | | | | | | Stocks at End of January 1932 |
|---|---|---|---|---|---|---|---|
| | Production | | Shipments | | Stocks at End of Month | | |
| | 1931 | 1932 | 1931 | 1932 | 1931 | 1932 | |
| Eastern Pa., N. J., and Md | 1,630 | 1,315 | 1,123 | 851 | 6,054 | 5,706 | 5,242 |
| New York and Maine | 151 | 319 | 182 | 166 | 1,957 | 1,575 | 1,423 |
| Ohio, Western Pa., and W. Va | 412 | 215 | 415 | 284 | 3,705 | 3,405 | 3,474 |
| Michigan | 109 | 114 | 219 | 121 | 2,814 | 2,093 | 2,099 |
| Wis., Ill., Ind., and Ky | 427 | 515 | 416 | 249 | 3,966 | 3,386 | 3,120 |
| Va., Tenn., Ala., Ga., Fla., and La | 836 | 290 | 768 | 359 | 1,833 | 1,749 | 1,817 |
| Eastern Mo., Ia., Minn., and S. Dak | 766 | 358 | 377 | 150 | 3,458 | 3,698 | 3,491 |
| W. Mo., Neb., Kan., Okla., and Ark | 263 | 179 | 404 | 239 | 2,077 | 1,942 | 2,003 |
| Texas | 286 | 280 | 328 | 256 | 740 | 847 | 823 |
| Colo., Mont., Utah, Wyo., and Idaho | 160 | 7 | 82 | 38 | 486 | 456 | 486 |
| California | 709 | 316 | 602 | 343 | 938 | 1,124 | 1,151 |
| Oreg. and Wash | 171 | 63 | 158 | 62 | 584 | 650 | 649 |
| Totals | 5,920 | 3,971 | 5,074 | 3,118 | 28,612 | 26,631 | 25,778 |

## EXPORTS AND IMPORTS OF HYDRAULIC CEMENT, BY MONTHS, IN 1931 AND 1932

| Month | Exports | | | | Imports | | | |
|---|---|---|---|---|---|---|---|---|
| | 1931 | | 1932 | | 1931 | | 1932 | |
| | Barrels | Value | Barrels | Value | Barrels | Value | Barrels | Value |
| January | 41,199 | $115,678 | 36,704 | $82,984 | 95,609 | $120,298 | 14,375 | $16,648 |
| February | 25,703 | 88,989 | ..... | ..... | 21,984 | 25,391 | ..... | ..... |
| March | 54,599 | 144,579 | ..... | ..... | 70,378 | 80,360 | ..... | ..... |
| April | 40,478 | 116,564 | ..... | ..... | 53,333 | 56,576 | ..... | ..... |
| May | 48,028 | 140,953 | ..... | ..... | 19,325 | 20,568 | ..... | ..... |
| June | 43,597 | 107,610 | ..... | ..... | 32,079 | 42,955 | ..... | ..... |
| July | 29,344 | 97,837 | ..... | ..... | 14,332 | 15,582 | ..... | ..... |
| August | 39,517 | 106,643 | ..... | ..... | 8,895 | 11,739 | ..... | ..... |
| September | 27,570 | 81,399 | ..... | ..... | 33,574 | 33,520 | ..... | ..... |
| October | 24,531 | 68,524 | ..... | ..... | 39,642 | 42,380 | ..... | ..... |
| November | 33,200 | 97,796 | ..... | ..... | 27,940 | 22,235 | ..... | ..... |
| December | 21,887 | 54,028 | ..... | ..... | 40,147 | 34,314 | ..... | ..... |
| Totals | 429,653 | 1,220,600 | ..... | ..... | 457,238 | 507,918 | ..... | ..... |

## PRODUCTION AND STOCKS OF CLINKER BY MONTHS, IN 1931 AND 1932 (*thousands of barrels*)

| Month | Production | | Stocks End of Month | | Month | Production | | Stocks End of Month | |
|---|---|---|---|---|---|---|---|---|---|
| | 1931 | 1932 | 1931 | 1932 | | 1931 | 1932 | 1931 | 1932 |
| January | 8,129 | 6,107 | 10,384 | 8,184 | July | 12,246 | ..... | 10,209 | ..... |
| February | 7,473 | 5,176 | 11,946 | 9,404 | August | 11,664 | ..... | 8,468 | ..... |
| March | 9,586 | ..... | 13,318 | ..... | September | 10,414 | ..... | 6,918 | ..... |
| April | 11,540 | ..... | 13,854 | ..... | October | 9,825 | ..... | 6,021 | ..... |
| May | 13,159 | ..... | 13,087 | ..... | November | 8,259 | ..... | 6,215 | ..... |
| June | 12,679 | ..... | 11,837 | ..... | December | 6,840 | ..... | 7,035 | ..... |




Production capacity utilized by months, January, 1931, to February, 1932.

# Recent Patents

## AMERICAN

**Cement**

*Production of hydraulic cement.* Gerald O. Case, Sevenoaks, England. No. 1,848,934.

**Crushing and Grinding**

*Crusher.* James A. Flint, Denver, Colo., assignor to Traylor Vibrator Co., same place. No. 1,847,083.

*Double-roll crusher.* Robert H. Beaumont, Radnor, Pa. No. 1,847,859.

*Attrition mill.* Walter L. Keefer, Chambersburg, Pa., assignor to Wolf Co., same place. No. 1,847,967.

**Drilling and Blasting**

*Cartridge-retaining device.* David Hodge, Centralia, Ill., assignor to Safety Mining Co., Chicago, Ill. No. 1,848,129.

*Rock drill.* George H. Gilman, Belmont, Mass., assignor to Worthington Pump & Machinery Corp., New York, N. Y. No. 1,848,340.

**Materials Handling**

*Trolley-bucket installation.* Harold E. Hallenbeck, Hudson, N. Y., assignor to Gifford-Wood Co., same place. No. 1,848,009.

*Bucket-guiding attachment for hoists.* Richard C. Cook, Aurora, Ill., assignor to Gifford-Wood Co., Hudson, N. Y.

*Excavating bucket.* John J. Gault, Chicago, Ill., assignor to W. J. Newman Co., same place. No. 1,848,166.

*Gravel spreader.* George G. Brackett, Rochester, Wash. No. 1,848,308.

*Dipper-trip mechanism for excavating machines.* George C. Morin, Holyoke, Mass. No. 1,848,643.

*Sand, gravel and chip spreader.* Ralph J. Sager and Floyd L. Coffman, Tiffin, O. No. 1,848,750.

**Mixers**

*Mixing apparatus.* Arthur G. Reed, Swissvale, Pa., assignor to McCrady Bros. Co., Braddock, Pa. No. 1,848,223.

*Mortar and plaster mixer.* Charles Longenecker, Milwaukee, Wis., assignor to Chain Belt Co., same place. No. 1,848,959.

**Screening and Separating**

*Adjustable screen.* Louis D. Peters, Jackson, O. No. 1,847,193.

*Screen separating method.* Dugald S. Paterson and Gustav B. Petsche, Cleveland, O., assignors to National Acme Co., same place. No. 1,848,141.

**Miscellaneous**

*Tool for fluid-actuated machines.* George Rauberstrauch, Cleveland, O., assignor to Cleveland Rock Drill Co., same place. No. 1,847,136.

*Method of and apparatus for pouring gypsum or like material.* George F. Pawling, Philadelphia, Pa. No. 1,847,261.

## FOREIGN

**Cement and Concrete**

*Manufacture of articles of concrete and the like.* B. Ruml and F. Ruml. British 367,051.

*Process for producing waterproof mortar-forming materials.* C. Fleisch. British 367,162.

*Process and apparatus for manufacturing concretes and mortars and generally all mixtures free from air.* E. Freyssinet. British 367,242.

*Method of and apparatus for burning slurry-like material, such as cement.* G. Polysius Akt.-Ges. British 367,505.

*Method of curing a concrete product.* MacGlashan Corp., Tecumseh, Mich., assignee of William H. Crume, Dayton, Ohio. Canadian 320,195.

*Alkali-resistant hydraulic cement.* Alexander Greig Fleming, Montreal, Que. Canadian 320,289.

*Improvements in the manufacture of cement.* J. C. Seailles. French 712,523.

*New process for manufacture of sidewalk slabs of cement and similar products.* C. Flande. French 712,865.

*Process and apparatus for thickening raw cement slurry.* J. J. Durieu and J. B. Grignon. French 713,050.

*Device for the testing of concrete and similar uses.* M. H. F. Tarde. French 713,391.

*Process for manufacturing, an insulating and light cement.* Kasp Winkler & Co. G. m. b. H. French 713,856.

*Process for molding hollow articles of concrete and products obtained by this process.* G. A. Chaybany. French 714,110.

*Process for manufacturing pipes of cement base.* E. M. Moutard. French 714,253 and 714,254.

*Process for preparing concrete.* G. C. Imbault and E. E. Marcotte. French 714,297.

*Process for manufacturing cementing materials.* H. Berry. French 714,935.

*Process for manufacturing a pulverulent hydraulic mortar.* R. Imer. French 716,366.

*Process and apparatus for drying slurry for the manufacture of cement or any other material.* U. J. B. Piron. French 715,494.

*Process for burning cement, lime or similar materials.* G. Polysius Akt.-Ges. French 715,220.

**Crushing and Grinding**

*Pulverizing mills.* C. R. Taylor. British 367,124.

*Fine grinding of coal, pigments, raw materials, for the manufacture of cement and the like.* K. Middelboe. British 367,548.

*Stone-breaking and other crushing machines.* H. R. Marsden, Ltd., and N. Taylor. British 367,631.

*Pulverizing machine.* Paul Arthur Hirsch, New York, N. Y. Canadian 320,077.

**Drilling**

*Back-head construction for rock drills.* Chicago Pneumatic Tool Co. British 367,664.

*Drill sharpener.* Ingersoll-Rand Co., New York City, assignee of Arthur Edward Peters, Phillipsburg, N. J. Canadian 320,185.

**Gypsum**

*Process for the manufacture of blocks and other molded articles of sulfate of lime base and products resulting therefrom.* C. Buffenoir. French 712,550.

*Improvements in gypsum blocks.* W. Makovski. French 39,178/683,490 (addition).

*Process for manufacture of porous construction units and similar products from gypsum.* F. Horner. French 717,577.

**Kilns**

*Tunnel kilns.* F. M. Hartford and S. M.Kier. British 367,396 and 367,397.

*Rotary kiln.* F. L. Smidth & Co., New York City, assignee of Johan S. Fasting, Valby near Copenhagen, Denmark. Canadian 320,214.

*Rotary kiln with inclined axis for drying, heating and calcining mineral or organic materials.* A. Beau. French 39,349/686,708 (addition).

*Apparatus for burning cement or similar materials.* G. Polysius Akt.-Ges. French 714,752.

*Improvements in rotary cement kilns, rotary coolers and the like.* J. S. Fasting. French 715,109.

*Tubular kiln installation for the treatment of cement raw slurry prepared by the wet process.* Fried. Krupp Grusonwerk Akt.-Ges. French 717,295.

**Material-Handling**

*Belting suitable for use in conveyors.* J. Dawson & Son, Ltd., and J. Dawson, Jr. British 366,938.

*Jigging or shaker conveyors.* A. Ross and H. Wood & Co., Ltd. British 366,985.

*Car-dumping apparatus.* General Electric Co., Ltd., and C. H. Marshall. British 367,083.

*Cranes, derricks, shear-legs and like lifting devices.* R. F. Nash. British 367,088.

*Apparatus for lifting and dumping cars.* R. Dempster & Sons, Ltd., and W. Hargreaves. British 367,148.

(*Continued on page 56*)

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# Traffic News and Comment

## Recent I. C. C. Decisions

*Cement.*—The commission has found that the rates on cement and plaster and related articles from Portland and Boettcher, Colo., and Hanover and Trident, Mont., to Buffalo, Wyo., were not unreasonable in the past but will be unreasonable in the future to the extent that the arbitraries over Clearmont, Wyo., may exceed 11 c. on cement and 14½ c. on plaster and related articles, exclusive of emergency increases in Ex Parte 103. This supports the proposed findings of the examiner reported in PIT AND QUARRY, Jan. 13, 1932, p. 109.—I. C. C. Docket No. 24,339, Colorado Portland Cement Co. *et al. v.* A. T. & S. F. *et al.*

## Examiners' Reports

*Cement.*—Examiner A. J. Sullivan recommends that the commission find that the rate on imported Portland cement from Corpus Christi, Tex., to Chihuahua, Tex., is not unreasonable or otherwise unlawful and dismiss the complaint in I. C. C. Docket No. 24,316, Hidalgo County Water Control and Improvement District No. Six *v.* St. L. B. & M. *et al.*

*Crushed Stone.*—Examiner W. H. Smith proposes that rates on crushed stone from Atlas, Highland and Limestone, Ky., to destinations in West Virginia, except to destinations on the Ripley and Spencer branches of the B. & O., will be unreasonable, but not otherwise unlawful, to the extent that they exceed or may exceed rates based on the West Penn Scale, prescribed in I. C. C. Docket No. 15,329, reported in 104 I. C. C. 717. Reparation is recommended on finding that rates to Ripley and Spencer were unreasonable but not otherwise unlawful, to the extent that they exceeded $1.90 and $2 respectively. However, rates for the future will be unreasonable to the extent that they exceed $1.80 and $1 90 respectively. All rates and reparation to be subject to Ex Parte 103 increases. Complaint was brought under Secs. 3 and 13 as reported in PIT AND QUARRY, June, 3, 1931, p. 68.—I. C. C. Docket No. 24,394, Olive Hill Limestone Co. *v.* B. & O. *et al.*

## New Complaints Filed

*Sand and Gravel.*—Violation of Sec. 1 is alleged and reparation sought in shipment of sand and gravel from Attica, Ind., to Stewardson, Ill., in I. C. C. Docket No. 25,090, Neal Gravel Co., Mattoon, Ill. *v.* Wabash.

## Rate-Committee Dockets

### New England Freight Assn.

*Lime.*—Shippers propose a reduction in the rate on common, hydrated, quick or slacked lime, car-load minimum weight 120,000 lb., in bulk in steel shipping containers loaded on container cars, from Lee and West Stockbridge, Mass., to Harlem River, N. Y., from 11c. to 10c. per 100 lb. They propose that containers detained by consignees, or authorized representatives, in excess of 24 hr. will be charged for at the rate of 30c. per day, or fraction thereof (except Sundays and legal holidays), for each container, time to be computed from first 7 a. m. after date of placement of cars at destination.—Docket No. 24,772.

### Trunk Line Assn.

*Cement.*—Carriers propose to establish on cement, car-load minimum weight 50,000 lb., to Johnstown, Pa. (B. & O. R. R.) and intermediate points affected from Neville Island, Pa., of 11c., and from Crescentville and Wampum, Pa., of 12c., and from Walford, Pa., of 12½c. per 100 lb.—Docket No. 28,800.

To meet motor-truck competition carriers propose to reduce the rate on cement, car-load minimum weight 50,000 lb., from Glens Falls, N. Y., to Whitehall, N. Y., to 6½c. per 100 lb.—Docket No. M-2,050.

*Crushed Stone.*—To meet motor-truck competition shippers propose establishment of a rate of $16 per car on crushed stone and screenings from Naginey, Pa., to Reedville, Pa., rate to expire Dec. 31, 1932—Docket No. M-2,049.

Carriers propose to establish specific rates on crushed stone, crushed-stone screenings, in open-top cars,[1] from Casparis, Dunbar, and Connelsville Bluestone Co., Pa., to destinations within a radius of 200 mi. in the states of Pennsylvania (located east of a line drawn north and south of Sand Patch), Maryland, West Virginia and Virginia, which will be based on the following mileage scale of rates.

| Miles | Rate | Miles | Rate | Miles | Rate |
|---|---|---|---|---|---|
| 15 | $0.60 | 60 | $0.90 | 150 | $1.30 |
| 25 | .70 | 80 | 1.00 | 175 | 1.40 |
| 40 | .80 | 100 | 1.10 | 200 | 1.50 |
| | | 125 | 1.20 | | |

To destinations on South Branch of B. & O. R. R. located south of Green Spring, W. Va., the rate will be 10c. per ton additional. To destinations located on connecting lines the rate will be 20c. per ton additional.—Docket No. 28,856.

*Diatomite.*—Carriers propose to establish the following rates on diatomite, car-load minimum weight 40,000 lb., from Novar, Ont. Rates are per 100 lb.—Docket No. 28,801.

| To | Rate |
|---|---|
| Buffalo, N. Y. | 27c. |
| New York, N. Y. | 35c. |
| Philadelphia, Pa. | 35c. |
| Pittsburgh, Pa. | 37c. |

*Furnace Limestone.*—Shippers propose a change in the description of furnace limestone, car-load, when loaded in open-top equipment to read: "Crude limestone, when loaded in bulk in open-top equipment," on traffic from Engle and Martinsburg, W. Va., to Piedmont, W. Va., and Luke, Md., as published in B. & O. I. C. C. No. 22,-120, with no change in rates. Investigation develops that there is no movement of furnace limestone, while there is a movement of crude limestone between the above points.—Docket No. 28,828.

### Central Freight Assn.

*Crushed Stone.*—Shippers at Genoa and Martin, O., are proposing a line of rates on crushed stone and screenings, in bulk, in open-top cars, to destinations in Michigan. Rates to representative destinations are shown below. A complete exhibit will be furnished on request.—Docket No. 30,775.

| To | Rate |
|---|---|
| Adrian | $0.80 |
| Hillsdale | 1.00 |
| Sturgis | 1.15 |
| White Pigeon | 1.25 |
| Kalamazoo | 1.35 |
| Wyandotte | .90 |
| Detroit | .95 |

Carriers propose to reduce the rate on crushed stone, in bulk in open-top cars, from Narlo, O., to Simons, O., from $1.40 to $1.35 per ton; to Coalburg, O., from $1.60 to $1.45 a ton; and to Haydenville, O., from 6th-class to $1.35 a ton.—Docket No. 30,802.

Shippers at Narlo, O., are asking for a reduction in the rate on crushed stone and related articles in bulk in open-top cars, to Chicago, Ill., from $4.60 to $1.60 a net ton.—Docket No. 30,805.

*Lime.*—Carriers propose to establish on fluxing lime, car-load minimum weight 50,000 lb., from Painesville, O., the following rates per 100 lb. to Cleveland, O., 7½c., to Warren, O., 8c.; to Lowellville and Youngstown, O., 8½c.; to Canton and Massillon, O., 9c. The classification basis now applies.—Docket No. 30,790.

Shippers are asking for a rate of $1.40 a net ton on carbonate of lime or recarbonated waste, car-load minimum weight 80,000 lb., from Painesville, O., to Akron, O. The present rate is $1.70 a net ton, car-load minimum weight 50,000 lb.—Docket No. 30,829.

Carriers propose to establish a rate on fluxing lime car-load minimum weight 60,000 lb., from Milltown, Ind., to Ashland, Ky., of $2.10 per net ton. The present rate is 13c. per 100 lb.—Docket No. 30,842.

*Quarry Waste.*—Shippers are asking for a reduction in the rate on quarry waste, car-load minimum weight 120,000 lb., from Sibley, Mich., to Detroit, Mich., from 40c. to 35c. per net ton.—Docket No. 30,768.

*Sand.*—Carriers propose to reduce the rate on industrial sand (blast, core,

engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, molding or silica) from Delhi, O., to Cambridge City, Ind., from $1.89 to $1.51 a net ton.—Docket No. 30,767.

*Sand and Gravel.*—Shippers at Fairview and Swanville, Pa., are proposing the following rates on common sand and gravel,[1] to expire March 31, 1933, present rates to be restored on that date.—Docket No. 30,778.

| To | Present | Proposed |
|---|---|---|
| Erie, Pa. | $0.50 | $0.45 |
| Swanville, Pa. | .50 | .45 |
| Conneaut, O. | .60 | .59 |
| Ashtabula, O. | .65 | .59 |

(Rate to Swanville applies only from Fairview.)

Carriers propose to establish a commodity rate of 95c. per net ton on sand and gravel from Gosport, Ind., to Centerpoint, Ind.—Docket No. 30,801.

Shippers propose a reduction in the rate on sand and gravel in open-top cars from Ft. Jefferson, O., to Houston, O., from 60c. to 45½c. per net ton to expire Nov. 30, 1932.—Docket No. 30,808.

Reductions in the rates on sand and gravel from Leeland, Ind., are proposed by carriers, to meet truck competition, and to expire Dec. 31, 1932. Rates shown are in cents per net ton. —Docket No. 30,618.

| To | Present | Proposed |
|---|---|---|
| Bremen, Ind. | $0.60 | $0.50 |
| La Paz, Ind. | .65 | .50 |
| Teegarden, Ind. | .69 | .50 |
| Union Center, Ind. | .69 | .55 |
| Wellsboro, Ind. | .75 | .60 |

*Fluxing Stone.*—Carriers propose to reduce the rate on fluxing stone from Quarry, Mich., to Saginaw, Mich., from 75c. to 60c. per net ton.—Docket No. 30,804.

**Illinois Freight Assn.**

*Ground Stone.*—It is proposed to reduce the rate on crushed, ground or pulverized sand stone, car-load minimum weight marked capacity of car, from Ottawa, Ill., to East St. Louis, Ill., from $1.64 to $1.39 per net ton.—Docket No. 6,535.

*Sand.*—It is proposed to establish a rate on lake sand,[1] ex-lake, from McCormick Dock, Ill., to St. Louis, Mo., of $1.39 per net ton. The present rate is 23c. per 100 lb., car-load minimum weight 40,000 lb.—Docket No. 6,533.

**Western Trunk-Line Committee**

*Feldspar.*—Shippers are proposing a reduction in the rate on crude or ground feldspar, car-load minimum weight marked capacity of car but not less than 60,000 lb., from Colorado common points, as described in W. T. L. Tariff 111-G, to Muncie, Ind., from 47½c. to 28c. per 100 lb.—Docket No. 4,129-Q.

*Gypsum.*—Shippers are proposing a revision of the rates on gypsum filler, ground gypsum and calcined plaster, from Medicine Lodge, Kan., to points in Trunk-Line territory, as published in A. T. & S. F. Tariff 14,010-A, I. C. C. 10,718. Rates to representative points are shown. A complete copy of exhibit will be furnished on request.—Docket No. 1,278-G.

| To | Present | | Proposed |
|---|---|---|---|
| | Keene's Filler | Keene's Cement | Gypsum Filler<br>Ground Gypsum<br>Calcined Plaster |
| Baltimore, Md. | 41½c. | 38½c. | 38½c. |
| Boston, Mass. | 47½c. | 44½c. | 44½c. |
| Norfolk, Va. | 41½c. | 38½c. | 38½c. |
| New York, N. Y. | 45 c. | 42 c. | 42 c. |
| Philadelphia, Pa. | 42½c. | 39½c. | 39½c. |

*Lime.*—Shippers propose a rate on lime, car-load minimum weight 60,000 lb., from Chicago, Ill., to all stations on the M. T. & W. R. R. including Wisconsin Dam, Wis., of 16c. per 100 lb. to alternate with the present rate of 17½c., car-load minimum weight 40,000 lb.—Docket No. 5,203-C.

**Southern Freight Assn.**

*Cement.*—It is proposed to eliminate arbitraries in connection with the rates on cement from C. F. A., I. F. A. and Southern producing points to destinations on the Moore Central Ry., published in Glenn's I. C. C. A-718.—Docket No. 57,218.

Shippers propose the amendment of C. F. A. Tariff 449-B, I. C. C. 2,315, revising all the rates on cement from C. F. A. territory to Monroeville, Ala., to reflect the Trunk Line basis.—Docket No. 57,246.

*Feldspar.*—It is proposed to revise the rates on feldspar, intraterritorially between points in southern territory, and interterritorially between points in southern territory on the one hand, and points in official classification territory on the other, by cancelling all existing commodity rates and classification exceptions and establish rates in lieu thereof on feldspar, crude or ground, car-load minimum weight 50,000 lb., on basis of 16 per cent. of first-class rates, subject to the minimum-rate provisions of the interterritorial class tariffs; except that the present commodity rates on feldspar—crude, not ground—subject to the existing carload-minimum weights, from points in Tennessee, North Carolina and Virginia to Brookneal, Va.; Erwin, Tenn.; Spruce Pine, Minproe, Toecane, Cane Branch and Bowditch, N. C., are to be continued where there is a present or prospective movement and made subject to Rule 27 via reasonably direct routes. Between points in Eastern Trunk-Line territory and N. E. F. A. territory, on the one hand, and Carolina zones 1 and 2 of I. C. C. Docket 10,500 (which are groups 1, 2, 3 and 4 of I. C. C. Docket 13,494 adjustment) on the other, the present commodity rates are to be continued, subject to the I. C. C. Docket 13,494, 16 per cent. of first-class rates as maxima. Commodity rates to and from points in W. T. L. territory are to be increased in the same amounts as Chicago, Ill.—Docket No. 57,142.

*Various Commodities.*—It is proposed to cancel Agent Jones' Tariff 228, I. C. C. U. S. 1, and all reference thereto in other tariffs applying from, to and between points in the United States.—Docket No. 57,161.

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## Foreign Patents

(*Continued from page 54*)

*Apparatus for measuring and controlling the delivery of material.* B. E. Ellson. British 367,149.

*Grab bucket.* Naamlooze Vennootschap Havenbedrijf Vlaardingen-Oost. British 367,190.

*Overhead traveling cranes.* G. R. Adamson and J. Adamson (trading as J. Adamson & Co) and A. V. Flinn. British 367,605.

*Troughed-belt conveyors.* R. S. Prior. British 367,727.

*Jigging conveyors.* O. Neddermann and H. Neddermann. British 367,737.

**Mining and Quarrying**

*Tubular pit-props, piles, arched-roof supports, and the like.* Bromford Tube Co., Ltd., and R. W. Spencer. British 367,218.

*Mine structures.* W. Esser. British 367,520.

*Pit props.* J. W. Bedford. British 367,581.

*Nine-car oiler.* Earle Barrington Paul, Thorburn, N. S. Canadian 320,093.

**Screening and Separating**

*Apparatus for cooling and screening granular substances.* W. Dryden. British 366,922.

*Apparatus for extracting or separating dust or other matter from air or gases.* Henan & Froude, Ltd., and G. H. Walker. British 367,120.

*Screening and filtering apparatus.* F. W. Brackett. British 367,144.

*Magnetic separators.* H. H. Thompson, A. E. Davies and W. E. Box. British 367,464.

*Centrifugal mineral separator.* Laurits I. Lorentsen, Vancouver, B. C. Canadian 320,305.

**Unclassified**

*Reinforcing means for concrete, cement, plaster and the like.* J. H. de W. Waller. British 367,254.

*Production of porous construction units.* I. G. Farbenindustrie Akt.-Ges. French 39,200/667,821 (addition) and 713,824.

*Process and machines for manufacture of small-diameter pipes of cement and asbestos.* "Eternit" Pietra Artificiale (soc. Anon.). French 712,950.

*Manufacture of molded products from hydraulic mortar materials.* Societe Cotrab. French 714,026.

*Porous artificial stone and method of manufacture.* E. Hornstein. French 716,874.

[1]The carload minimum weight will be 90 per cent. of the marked capacity of the car, except that, when loaded to its full cubical or visible capacity, the actual weight will apply.

# Financial News

*The information contained in these financial pages is given with the understanding that any statement on the part of this magazine or any of its staff, as to the responsibility or standing of any person, firm or corporation, or as to the value of any property or securities is a mere expression of opinion, given as a matter of service to the readers of* PIT AND QUARRY, *for which no responsibility in any way is to attach to this magazine or to any of its staff.*

## Lehigh Cement Earnings Decline Sharply in 1931

Report of Lehigh Portland Cement Co. for the year ended December 31, 1931, shows net income of $79,328 after depreciation, taxes, etc., equivalent to 40 c. a share (par $100) on 197,594 shares of preferred stock outstanding at close of the year. In year ended November 30, 1930, company reported net profit of $2,105,993 equal after dividends on preferred stock, to $1.46 a share (par $50) on 450,348 shares of common stock. The company's fiscal year has been changed to end December 31, instead of November 30.

Income account for the year ended December 31, 1931, compares as follows:

| | Yr. ended Dec. 31, '31 | Yr. ended Nov. 30, '30 |
|---|---|---|
| Sales | $12,292,369 | $16,699,886 |
| Costs | 8,372,519 | 9,775,382 |
| Depreciation, etc. | 1,811,153 | 2,026,634 |
| Expenses | 2,370,728 | 3,049,504 |
| Operating loss | $ 262,031 | *$ 1,848,366 |
| Other income | 341,359 | 514,911 |
| Total income | $ 79,328 | $ 2,363,277 |
| Federal taxes | ..... | 257,284 |
| Net profit | $ 79,328 | $ 2,105,993 |
| Preferred dividends | 1,404,439 | 1,450,354 |
| Common dividends | 112,332 | 786,160 |
| Deficit | $ 1,437,443 | $ 130,521 |

* Profit.

Current assets as of December 31, 1931, including $10,762,511 in cash, United States Government bonds and Treasury certificates at cost, were $15,323,193 and current liabilities were $487,783. On November 30, 1930, cash, Liberty Loan bonds and U. S. Treasury certificates at cost were $13,411,183, current assets $18,701,256 and current liabilities $1,282,645.

## Texas Gulf Sulphur Has Huge Material Inventory

Inventories of Texas Gulf Sulphur Co. last year were built up to the highest point on record, $14,192,158 against $11,928,750 in 1930 and $8,731,960 in 1929. This sulphur above ground is carried at cost, which is substantially below market value, thus constituting an important reserve fund since it does not depreciate in quality while in storage. Its production has already been charged to operating expense and thus sales out of inventory when business improves will greatly improve cash position.

The price of sulphur continues unchanged and there is so far no indication that any reduction in price is likely. Consumption would not be increased by any lowering of the price and since sulphur is a necessity and has no available substitute, there is no reason why a reduction should be made by the producers.

The recent reduction of the dividend of Texas Gulf to a $2 annual rate from the $3 previously paid was due mainly to company's need for conserving cash in view of the lower rate of earnings prevailing at the beginning of the current year. Texas Gulf reported net profit of $8,942,602, equal to $3.50 a share, for 1931, against $13,972,085, or $5.50 in 1930.

Thus the $3 dividend rate was well covered last year, and the actual dividend distribution, totaling $8,255,000, including one payment of $1 quarterly, was also covered with $687,602 to spare. However, with inventories of sulphur above ground increased, cash showed a decline to $3,477,002 from $5,488,050, or to lower than the usual level.

## Material Service Corp. Reports $2.41 Per Share

Material Service Corp. of Chicago, Ill., sand, gravel and crushed-stone producer, reports net income for 1931 of $302,081, equal to $2.41 a share on the capital stock comparing with net of $265,040 or $2.12 a share in 1930.

Cash is shown about $70,000 smaller than in 1930 and marketable securities are less by approximately $22,000, all of which was more than offset by a reduction in bank loans to $95,000 from $335,000. Earned surplus was reduced to $1,407,364 from $1,511,543 at the end of 1930.

"None of the profits realized from the sale or collections during the year of fixed assets sold is reflected in the net profits reported," Henry Crown, president, said in remarks to the stockholders in the 1931 report.

A detailed comparison of the financial statement follows:

**Assets**

| | (As of December 31) 1931 | 1930 |
|---|---|---|
| Current assets: | | |
| Cash | $ 34,587 | $ 104,757 |
| Marketable securities (cost) | 107,135 | 129,254 |
| Accounts receivable | 815,268 | 1,215,548 |
| Inventories | 264,312 | 365,403 |
| Cash value insurance | 16,554 | ..... |
| Balance to be liquidated | 257,058 | 400,407 |
| Total current assets | $1,494,914 | $2,215,369 |
| Prepayments | 6,870 | 7,500 |
| Investment (cost) | * | 133,527 |
| Deferred charges | ..... | 230,000 |
| Fixed assets | 2,544,230 | 2,689,483 |
| Other assets | 775,315 | 249,624 |
| Good will | 1 | 1 |
| Total assets | $4,821,330 | $5,525,505 |

**Liabilities**

| | | |
|---|---|---|
| Current liabilities: | | |
| Bank loans | $ 95,000 | $ 335,000 |
| Notes due | ..... | 117,500 |
| Accounts payable | 419,654 | 735,185 |
| Accruals | 94,449 | 124,700 |
| Total current liabilities | $ 609,103 | $1,312,385 |
| Purchase money obligations | 39,500 | 45,460 |
| Funded debt | 341,333 | 341,333 |
| Note due 1933 | 100,000 | ..... |
| Minority interest | 25,000 | 25,000 |
| Capital stock | 1,250,000 | 1,250,000 |
| Capital surplus | 1,049,029 | 1,039,784 |
| Earned surplus | 1,407,364 | 1,511,543 |
| Total liabilities | $4,821,330 | $5,525,505 |

* Included in other assets in 1931.

## Atlas Rock Co. Resumes Aggregates Production

The plant of the Atlas Rock Co. at Oakdale, Cal., has been reopened after considerable new machinery had been installed. The company markets washed aggregates under the brand name of "Atrock."

**CURRENT DIVIDENDS**

| Company | Class of Stock | Dividend Rate | Holders of Record | Payable |
|---|---|---|---|---|
| Alpha Portland Cement | Preferred | $1.75 qr. | Mar. 1 | Mar. 15 |
| Arundel Corp. | Common | $0.75 qr. | Mar. 23 | Apr. 1 |
| Boston Sand & Gravel | Common | $0.15 qr. | Mar. 22 | Apr. 1 |
| Boston Sand & Gravel | Preferred | $0.87½ qr. | Mar. 22 | Apr. 1 |
| Canada Cement | Preferred | $1.62½ qr. | Feb. 29 | Mar. 31 |
| Cleveland Quarries Co. | Common | $0.25 qr. | Feb. 15 | Mar. 1 |
| Dufferin Pav. & Crushed Stone | Preferred | $1.75 qr. | Mar. 24 | Apr. 1 |
| Fitzsimons & Connell | Common | $0.50 qr. | Feb. 19 | Mar. 1 |
| Hazle Atlas Glass | Common | $0.25 extra | Mar. 19 | Apr. 1 |
| International Amiesite | Preferred | $1.75 qr. | ..... | Mar. 1 |
| International Cement | Common | $0.50 qr. | Mar. 11 | Mar. 31 |
| International Salt | Common | $0.50 qr. | Mar. 15 | Apr. 1 |
| Johns-Manville | Preferred | $1.75 qr. | Mar. 11 | Apr. 1 |
| National Gypsum Co. | Preferred | $1.75 qr. | Mar. 19 | Apr. 1 |
| Owens-Illinois Glass | Preferred | $1.75 qr. | Mar. 16 | Apr. 1 |
| Pennsylvania Glass Sand | Preferred | $1.75 qr. | Mar. 25 | Apr. 1 |
| Pittsburgh Plate Glass | Common | $0.25 qr. | Mar. 10 | Apr. 1 |
| Superior Portland Cement | Class A | $0.27½M | Mar. 23 | Apr. 1 |
| Texas Gulf Sulphur | Common | $0.50 qr. | Mar. 1 | Mar. 15 |
| U. S. Gypsum Co. | Preferred | $1.75 qr. | Mar. 15 | Mar. 31 |
| U. S. Gypsum Co. | Common | $0.40 qr. | Mar. 15 | Mar. 31 |
| Warner Co. | 1st Pfd. | $1.75 qr. | Mar. 15 | Apr. 1 |
| Worcester Salt | Common | $1.25 qr. | Mar. 24 | Mar. 31 |

# Review of Foreign Practice

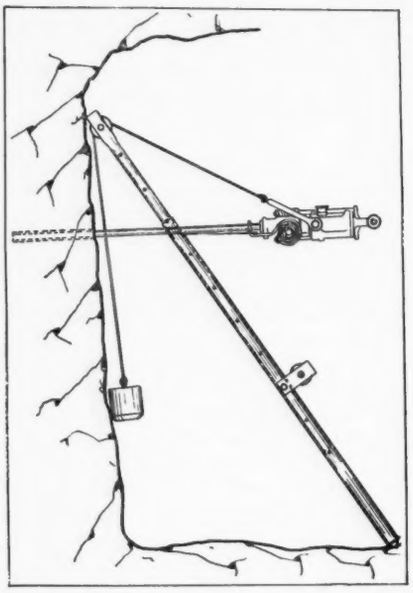
## Improved Type of Shaft Kiln for Making Cement

Taking advantage of improvements made in shaft kilns within the last few years, the new Portland-cement plant of Buscal Freres at Genievres in the department of Ain, France, operates with a single automatic shaft kiln with a capacity of 60 to 80 metric tons of clinker daily. This company has for many years produced lime, hydraulic lime and natural cement, and has only recently decided to enter the production of artificial cement, having a deposit well suited for it and a good prospective market.

The new cement plant adjoins the former plants of the company, having in common the facilities for receiving raw material (a calcareous marl) from the quarry. In the new installation stone is first broken down in a gyratory crusher, then is dried in a rotary drier and is given a secondary reduction in a rod-mill, and finally is ground in a compound mill. The pulverized raw material is stored in silos equipped at their tops and bottoms with screw-conveyors which make it possible to correct the mix in the bins if necessary. Before firing, the raw mix is withdrawn from these silos and mixed with pulverized coal. The burned clinker is crushed at once in a jaw crusher, then conveyed to storage. From storage it is reclaimed to a compound mill for finish grinding, and then passes to the packing plant.—H. Teysseire in *Revue des Materiaux de Construction* No. 267, pp. 502-506, Dec., 1931.

## Counter-Weighted Drill Support Speeds Output

The output of miners using ordinary hammer-drills for horizontal, inclined or overhead drill-holes can be increased considerably by using the counter-weighted drill support shown in the accompanying illustration. This device, of course, is not intended to replace mounted drills or automatic advancing drills on larger jobs, but for smaller installations it can be of real service. The apparatus consists of a pole of variable length, a pulley, a cable or chain, and a counter-weight. The pole may be two tubes, one sliding within the other and fixed at any desired position by means of a pin. The cable or chain passes over the pulley located at the top of the upper tube. One end of the cable is connected with a shackle attached to the drill at its center of gravity, and the other end with the counter-weight. In the position illustrated the drill is submitted to the action of two forces—the force of gravity on the drill and the pull of the cable. The counter-



Drawing showing operation of counter-weighted drill support.

weight is selected so that the resultant of these forces is a pressure in the line of the axis of the bit. Under these conditions the driller is freed from supporting the weight of the drill and from almost all vibration, and can devote his efforts to controlling the proper penetration of the drill.

Variations in the set-up of the device make it applicable to problems other than the horizontal drill-hole illustrated. For making a drill-hole near the bottom of the pole, a second guide pulley can be attached to the pole a little above the position of the drill. For making a vertical drill-hole overhead the pole is stood upright, the drill turned up to the proper pitch and the drill supported by a collar around the pole, though leaving the bit free to rotate.—Gaston Lejard in *Mines, Carriers, Grandes Entreprises* 10:5-6, Dec., 1931.

## Tells Story of Finding of the Cement Bacillus

It is well known that the name "cement bacillus" was applied by Michaelis to calcium-sulphoaluminate to indicate that this double salt, since it takes up such large amounts of water and thus ruptures the set cement or concrete in which it forms, is as dangerous to coment or concrete as is the organic bacillus to a living organism. Michaelis and Candlot, as well as other investigators since then, were able to produce this double salt artificially, but for a long time it was not possible to isolate it in set cement or concrete. Finally Passow and Schönberg made an exhaustive report (*Tonindustrie-Zeitung*, 1917, pp. 393, 402, 412, 420, 427, 435) on their extensive efforts to isolate the cement bacillus and their attempts to obtain it by storing cement specimens in sulphate solutions. These efforts were at last successful, and it was possible to observe whole clusters of crystals in the broken specimens, under the microscope, and a series of illustrations of it were published in the report.

Only recently Frau Fey-Schönberg, at that time Passow's assistant, revealed in a humorous fashion in a talk over the radio from Hamburg how she, at the direction of Passow, systematically sought the bacillus and discovered it. At that time she had only recently completed her chemistry course and during the war had become Passow's research assistant. Irritated once at the fruitless attempts, she threw aside rather violently the specimen with which she had been working, and she observed that its "ring" was not that of the customary specimens with which she had worked. When she showed this to Passow he replied that he had a poor ear for music and that all he could sing to any tune was *The Watch on the Rhine;* anyone who knew Passow personally has some idea of the ridicule to which his joking must have exposed her. Nevertheless she continued her observations on the ring of the test specimens, although in secret, and after some time she again found a specimen that gave the same peculiar sound she had first observed. To be safe from ridicule she waited until all other employees had left the laboratory. Then she broke open her new specimen, and under the microscope she found a glorious crystal like a star-fish, and by increasing the power of the microscopic enlargement she brought to view a whole cluster of the cement-bacillus crystals.

Still in her laboratory smock she rushed to Passow's home, and found him in his garden along with some friends over their wine. He listened to her with some skepticism and followed her back to the laboratory with the tolerance one shows a child with a new toy; but after peering through the microscope he stretched himself to his whole enormous height and whispered, "Eureka." Then followed a great many painstaking investigations and checks that resulted in the announcement of the discovery in the technical press.

Frau Fey-Schönberg's story over the radio is an interesting insight into the methods of research; many important discoveries result similiarly from accidents, but they are profitable accidents only if the observer has the sharpness of perception to see their significance. — *Tonindustrie - Zeitung*, 56:216-217, Feb. 18, 1932.

# Manufacturers' Publications

*Each publication listed below contains information of interest to nonmetallic mineral producers. Readers may obtain, without charge—except where a price may be stated—and without obligation, copies of any of these publications by writing directly to the manufacturers who publish them. Please mention* PIT AND QUARRY *when writing.*

**Air Compressors**

*Le Roi Portable Air Compressors.* 4 p. (Bull. PC. The Le Roi Co., Milwaukee, Wis.) Describes and illustrates a series of one- and two-cylinder air compressors with displacements ranging from 18 to 74 cu. ft. per min. at 1,000 r.p.m The L-head motor and the compressor are connected with a common crankshaft and employ the same oil pan.

**Conveyors, Belt**

*How Shall We Handle It?* 24 p. (The Diamond Rubber Co., Inc., Akron, O.) A well-illustrated booklet on handling problems in various types of industrial plants, including cement, sand-and-gravel, crushed-stone and salt workings, showing how belt conveyors solved the problems.

**Dredging**

*The Hydraulic Pipe-Line Dredge "Three Brothers."* 8. p. (Bull. No. P6. American Manganese Steel Co., Chicago Heights, Ill.) Describes and illustrates the design and operation of a new all-steel dredge equipped with rotary cutter ladder and spuds and using Diesel-engine power. The outfit, owned by the R. P. Emerick Dredging Co. of Mt. Clemens, Mich., was built for service in the Great Lakes region.

*Morris Type F Heavy-Duty Dredging Pumps.* 4 p. (Bull. No. 146. Morris Machine Works, Baldwinsville, N. Y.) Describes a new type of heavy-duty dredging pump and illustrates its important features, which include an impeller and casing of large diameter permitting low speed running even at high operating heads. The pump was especially designed for handling abrasive materials.

**Engines, Gasoline**

*LeRoi Engines.* (The LeRoi Co., Milwaukee, Wis.) A new series of four-page bulletins describing and illustrating the four-, six-, and eight-cylinder valve-in-head gasoline engines made by this concern. Bulletins 5E and 160 describe the four-cylinder models, the sixes are shown in Bulletins 6E and 150, while Bulletin 7E gives specifications of the eight-cylinder type.

**Excavators**

*Marion Type 450.* 16 p. (Bull. 347. The Marion Steam Shovel Co., Marion, O.) Describes and illustrates a 1¼-cu. yd. convertible shovel, available in gasoline-electric or Diesel-electric power. Mechanical specifications and tables of working ranges of the machine are included.

*P & H Model 200-A.* 6 p. (The Harnishfeger Corp., Milwaukee, Wis.) Describes a convertible excavator of ⅜-cu. yd. capacity driven by a 45 hp. engine. Available with 17-ft. shovel boom or 30-ft. drag-line or crane boom. Features are illustrated in a series of detail photographs.

**Hoists**

*Galion Extra Heavy Duty Hydraulic Hoist.* 4 p. (Bull. No. 2—32. The Galion Allsteel Body Co., Galion, O.) Describes and illustrates a new hydraulic hoist for dump-truck bodies where heavy-duty service is necessary. The equipment employs a 6⅛-in. diameter hoist cylinder.

*Wood Mechanical Hoists and Vertical Hydraulic Hoists.* 4 p. (Bull. No. 5. Wood Hydraulic Hoist & Body Co., Detroit, Mich.) Describes a mechanical hoist for truck bodies employing chasses of 2 to 7½ tons capacity. A vertical hoist for concrete-mixer trucks in approximately the same range is also illustrated and described. Contains specifications and prices.

**Plants and Equipment**

*Fuller-Kinyon Portable Unloading and Conveying Systems for Bulk Cement.* 12 p. (Bull. No. B-4. The Fuller Co., Catasauqua, Pa.) Describes and illustrates complete equipment for unloading bulk cement from box cars and barges and for the recovery of the material from warehouse storage by the pneumatic-conveying method.

*Ladel Elevating, Conveying and Screening Equipment.* 6 p. (The Ladel Conveyor & Manufacturing Co., New Philadelphia, O.) Describes and illustrates a wide variety of elevating equipment, screens and conveyors for use in pits, quarries and processing plants.

**Tractors**

*McCormick-Deering Industrial Tractors.* 4 p. (International Harvester Co., Chicago, Ill.) Describes and illustrates a well-known industrial tractor and illustrates some of its numerous applications.

**Miscellaneous**

*Cleveland Type Q Quick-Acting Steel Couplings.* 8 p. (Bull. No. 107. The Cleveland Rock Drill Co., Cleveland, O.) Describes and illustrates a snap-on hose coupling for drilling work. The coupling is made of bar steel and is cadmium plated to prevent rust.

## Statement of Ownership

PIT AND QUARRY

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of PIT AND QUARRY, published bi-weekly at 538 S. Clark Street, Chicago, Ill., for April 1, 1932.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared H. W. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Complete Service Publishing Co.; Editor, S. A. Phillips; Managing Editor, S. A. Phillips; Business Manager, H. W. Baumgartner, all of Chicago, Ill.

2. That the owner is Complete Service Publishing Co., Chicago, Ill. That the stockholders owning 1% or more of the total amount of stock are: H. W. Baumgartner and I. A. Baumgartner, both of Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

H. W. BAUMGARTNER,
Business Manager.

Sworn to and subscribed before me this 21st day of March, 1932.

(Seal.) M. J. STANTON,
Notary Public.

My commission expires Dec. 9, 1934.

# New Machinery and Supplies

## New Excavator Line to Fit Pared-Down Budgets

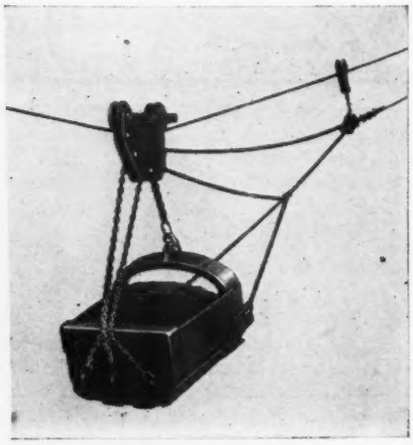
From Sauerman Bros., Inc., comes the announcement of a new line of drag-scraper and slackline-cableway machines, designated as the Sauerman "Utility" machines, priced much below the general level that has prevailed in the past for excavators of similar capacity and range of operation, a direct reflection of lower manufacturing costs and of substantial economies effected by simplifying certain features of design and construction.

The "Utility" machines are being manufactured in only a few popular sizes, such as will cover the requirements of probably seven out of ten excavating problems, whereas the main line of Sauerman scraper and cableway equipment will continue to be manufactured in a large range of sizes to meet any and every capacity requirement up to 600 cu. yd. per hr., and for any length of haul up to 1,000 ft. or more.

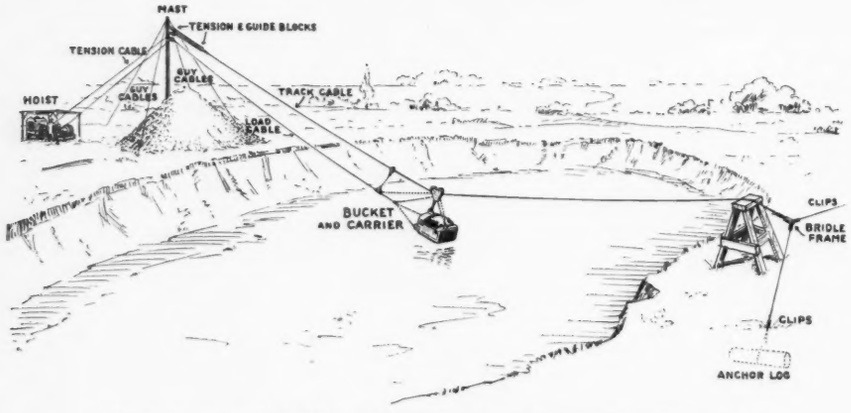
The "Utility" slackline cableway excavators are offered with four different sizes of buckets—of 9, 13, 20 and 26 cu. ft. capacity—and with operating spans of 300, 400 and 500 ft. The machines are divided into three series—gasoline-driven, electric-driven and belt-driven. The "Utility" bucket embodies several new features of construction tending to lighten the weight and increase the strength. Among these features are a rugged structural steel bail and a welded back. Another valuable detail of the bucket is its renewable, reinforced bottom. The carrier is equipped with alloy-steel track sheaves. The mast-blocks are the long-life "Durolite" steel blocks. The power units are of rugged construction with semi-steel drums of large diameter and length, semi-steel side stands, steel gears provided with ball bearings, steel shafts accurately turned and polished. The hoists are mounted on rolled-steel bed-frames of one-piece box construction. The gasoline engine or electric motor furnished for each size of hoist is more powerful than formerly specified for machines of similar rating.

The "Utility" drag-scraper machines come in five models of gasoline-driven types, and a like number of electric-driven and belt-driven machines. The buckets used are Sauerman "Crescent" scrapers of 9, 13, 20, 26 and 40 cu. ft. capacities.

Space is lacking to go into detail regarding the many interesting features of these machines. Anybody desiring this detailed information should write to Sauerman Bros., Inc., 434 S. Clinton St., Chicago, requesting Catalog No. 16, a 40-page booklet just published, which gives complete descriptions and specifications.



Utility bucket and carrier assembly.




Typical set-up of slackline cableway for excavating gravel under water.

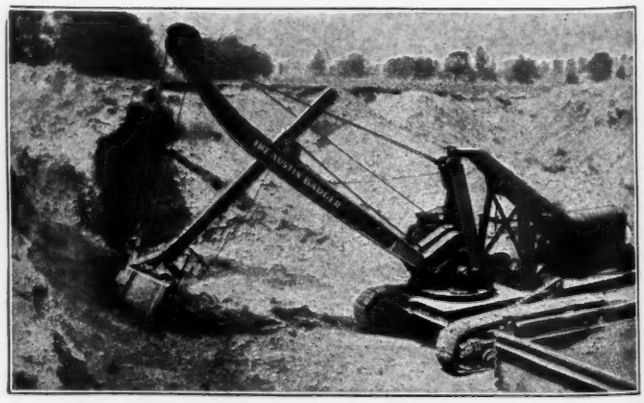
## Flexibility of Excavator Widens Field of Utility

In the sand-and-gravel and premixed concrete fields there has always been a definite place for shovel equipment but only in recent years have the smaller shovels of ½-cu.yd. or less come into use. With somewhat lower outputs the smaller shovels have shown definite economies in operating costs. Then, too, the small shovel is now more of a general utility tool, according to C. E. Kohl, engineer of the Austin Machinery Co., who recently placed such a machine, a ⅜-cu.yd. convertible excavator, on the market.

In about an hour's time the standard dipper and dipper boom can be removed and a crane boom with clamshell attachment can be installed. Thus equipped, the shovel becomes a tool for the handling of a wide variety of bulk materials. The unloading of material from cars to stock-pile and the loading from stock-pile to dump cars or into trucks, is work that is economically handled with this equipment.

Probably one of the most useful attachments for a small tractor shovel is the crane with a telescopic boom equipped with a sheave hook block. Such a boom may be about 25 ft. long with a 10-ft. telescopic extension which provides a 35-ft. reach. Although capacities vary greatly, a ⅜ cu.yd. shovel when converted as a crane will handle loads of approximately 3,000-lb. at a radius of 15-ft. Where the boom is almost vertical and the entire machine is moved with the tractors, the load can be increased somewhat beyond that limit.

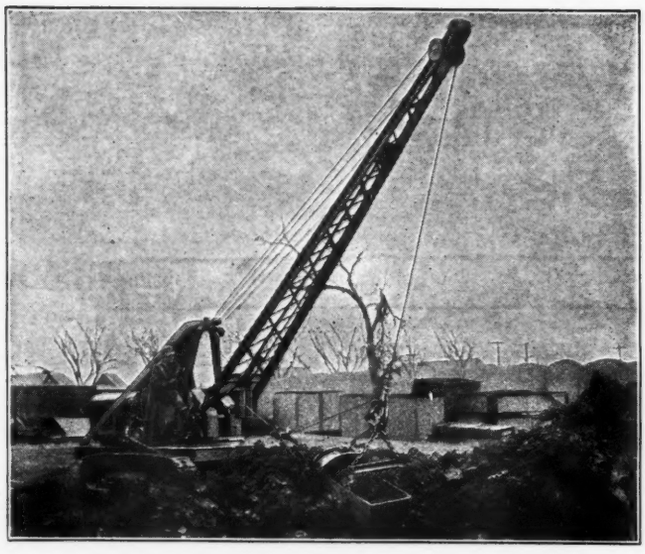
Aside from general construction operations the drag-line attachment is often a very useful modification. For trimming up stock piles or for grading filled in land, the drag-line handles the work with maximum efficiency. In building up dikes, as a protection against floods or around oil tanks, the drag-line can be used when



Shovel loading truck in gravel pit.

a foot or two of the surrounding terrain can be utilized to provide the material for the dike.

There are many types of excavating problems where the adaptability of the convertible shovel comes into play. When equipped with a trench hoe, the shovel can be used for digging trenches up to 14-ft. in depth and for digging and cleaning ditches up to 20-ft. in width at the top.



The tractor shovel converted to drag-line.

While the extension of the field of work for the convertible shovel is due in a large measure to the attachments which manufacturers have provided, it is also due to the many mechanical improvements in this class of equipment. The shovel of today is a much more reliable piece of equipment than formerly. It has a greater degree of flexibility, portability and the maintenance and operating costs are much lower. This latter point is partially due to the fact that heavy anti-friction bearings are used at every moving point of consequence. The reduction in friction losses on shovel equipment has brought about a very definite reduction in the size of the power plant required to perform the same operations.

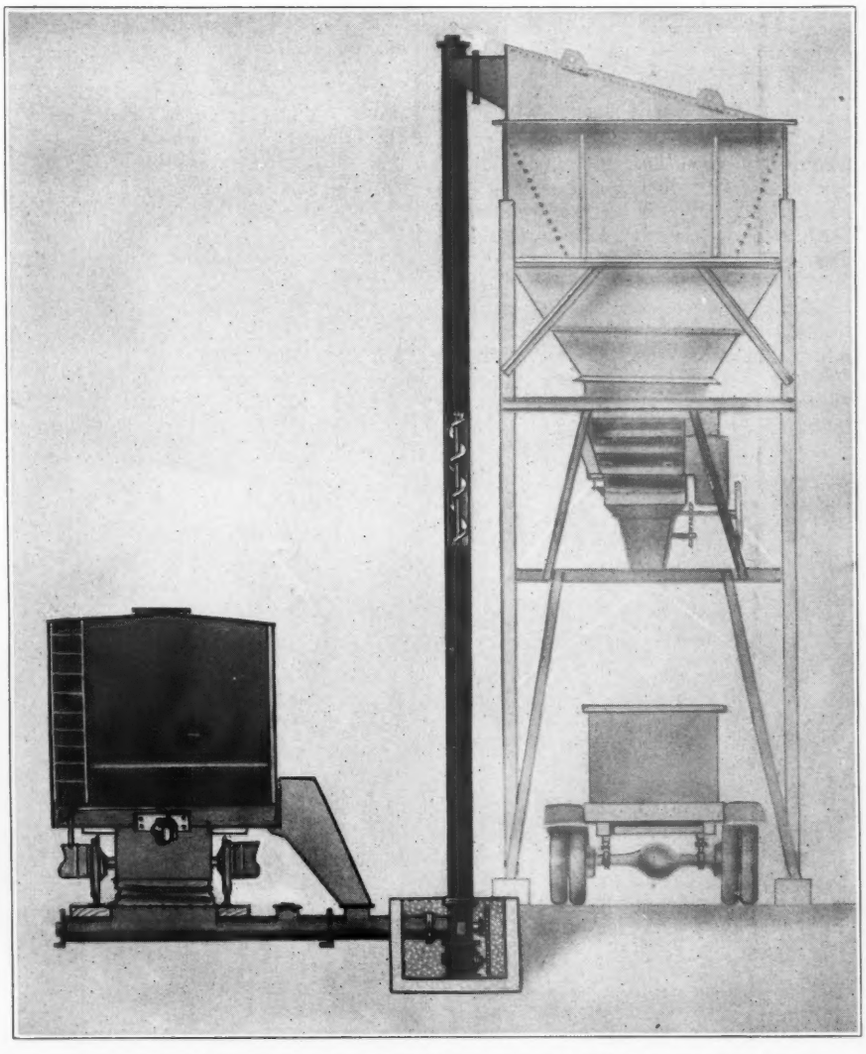
Then there are many other mechanical refinements such as booster-type clutches, brakes which are readily renewable, high-pressure lubrication at all points and a greater degree of accessibility. Shovels are now designed so that all of the clutches are interchangeable and of a more or less standard tractor design so that repair parts are obtainable anywhere without difficulty. Cut gearing, enclosed and running in oil, is another design feature now utilized in small shovels.

Another point which has been given considerable attention has had to do with increased portability. Tractor speeds as high as four miles an hour on the road are now obtainable although it is not ordinarily the practice to depend on the machine's crawlers to transport it any distance. It is the usual practice to provide a mounting of rubber tired wheels for quick transportation and tow behind a truck. With such a mounting it is possible to transport a shovel at a speed of 25 mi. per hr. from job to job. By utilizing the power of the crawlers and with suitable blocks it is possible to mount the shovel on its wheels in approximately 10 minutes and to de-mount it in five minutes.

## Develops Unloader for Users of Bulk Cement

A portable and economical outfit for unloading bulk cement from special hoppered cars or ordinary box-cars has been developed by Sprout, Waldron & Co., Inc., of Muncy, Pa. The system is designed to be of especial worth to operators of ready-mixed concrete plants, contractors and road builders.

The unloading outfit, known as the Monarch, consists of specially designed spiral screws, inclosed in electrically-welded pipe, and arranged to be driven from a single power source. Throughout it is watertight and dust proof, and needs no other housing. All bearings are doubly sealed against the entry of cement, and none comes in direct contact with the cement. The screws are extra heavy. A cast steel top assembly with a ball-thrust, adjustable bearing supports the vertical uniflow screw. The case rests on a cast-steel base, equipped with steel-cut miter gears in an oil-tight case, and is carried on a ball-bearing cross shaft. Horizontal screws can be arranged to be used in connection with special hoppered or ordinary box cars. When cement is bought in ordinary box-cars, a Clark type power shovel is used with the conveyors. This is mounted on the bin frame and driven by the same power unit operating the conveyors. Roller-chain drives are used throughout.



Cross-sectional drawing showing the operating details of the bulk-cement unloader.

The Monarch unloading method was first tried and tested by the Hercules Cement Co. at its plant. After being subjected to severe tests, it was given an unqualified O.K., according to Sprout, Waldron officials. The plant operates automatically and simplifies handling to a high degree.

## Cone Crusher, Vibrating Screen Used in Portable

A new Telsmith portable crushing-screening-loading plant, recently introduced by Smith Engineering Works, is a lighter, compact and easily portable unit. Designed to meet the latest trend in highway specifications which, in most states, now call for finer rock, this new outfit is said to be the only portable plant equipped with a standard, large commercial plant type crusher for finer reduction in large capacities.

The plant is further distinguished for its large screening capacity, being equipped with a vibrating screen instead of the shaker screen ordinarily used. Another unique feature of the new Telsmith is that it may be furnished interchangeably with a No. 24 cone crusher; or a Telsmith-Wheeling jaw crusher in any one of four sizes.

For fine crushing in large tonnages . . . products finer than ¾ in., and larger capacities for ¾ in. to 1 in. rock, the Telsmith No. 24 cone crusher is recommended. This is a steel gyratory-type crusher with an umbrella-shaped head and unobstructed feed opening, operating at high speed with a graduated crushing stroke and spring release against choking.

For coarser crushing, ¾ in. to 1-in. rock, in moderate capacities, is required, the makers equip the outfit with a Telsmith-Wheeling jaw crusher. It is a roller-bearing jaw crusher, equipped with massive frame and swinging jaw, both annealed cast steel, and has manganese-steel jaw dies and cylindrical roller bearings.

All standard Telsmith portables are equipped with a Telsmith standard plate feeder, 16 in. by 5 ft., self contained, with a steel supporting frame, and having an eccentric which is adjustable to function at different capacities; Telsmith standard vibrating screen, 3 ft. by 8 ft., an all-steel, roller-bearing vibrator designed to give uniform balanced vibration under all conditions of load, with maximum output . . . two Telsmith conveyors—a 42-ft. feed conveyor; also a 50 ft. finished-product conveyor and a 10 or 20 cu. yd. portable steel bin, or when preferred, a short conveyor for loading direct to trucks. Metal wheels are standard equipment, but where frequent moves are necessary rubber-tired wheels are available at slight extra cost.

## Handy Car-Puller Is of Drum-and-Capstan Type

A new combination type of drum and capstan car-puller has been developed recently by the Fridy Hoist & Machinery Co. of Mountville, Pa. The machine is used for "spotting" loaded railroad cars. It can be operated in either direction and at slow rope speed. The puller is furnished in standard motor ratings of 10, 15 and 20 hp. for handling strings of cars up to 500 tons loaded capacity. Steel cable on the drum is used for long hauls while for shorter pulls, up to 300 ft. or less, manila rope on the capstan is used.

Features of the new machine include a double V-shaped friction clutch which is asbestos lined, and an improved type of screw thrust, assuring a positive grip and release of the drum by only a slight movement of the operating lever.

The triple spur gears of the drive are of cast-steel inclosed in a cast-iron housing for safety. The complete unit is mounted on a steel I-beam sub-base. The main operating lever, motor-control switch and foot brake are within easy reach of the operator.

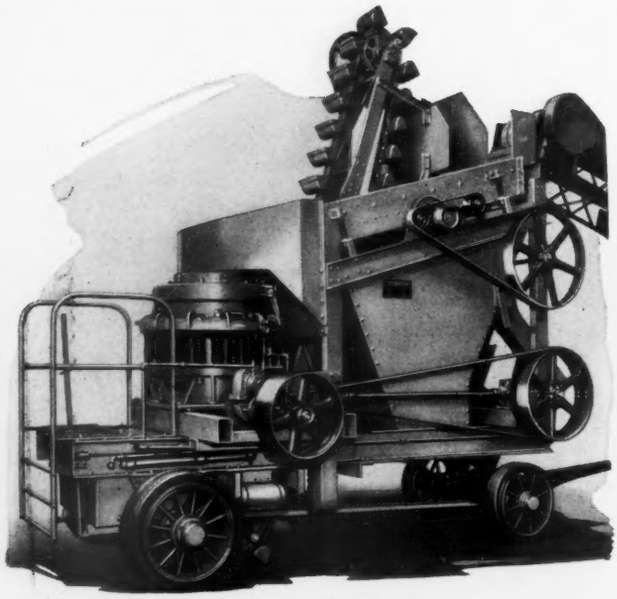
## Introduces New Ideas in Steel Storage Bins

A new type of bin construction with interlocking steel sheet-piling for the storage of crushed stone, coal, and similar materials, has been developed by the Bethlehem Steel Co.

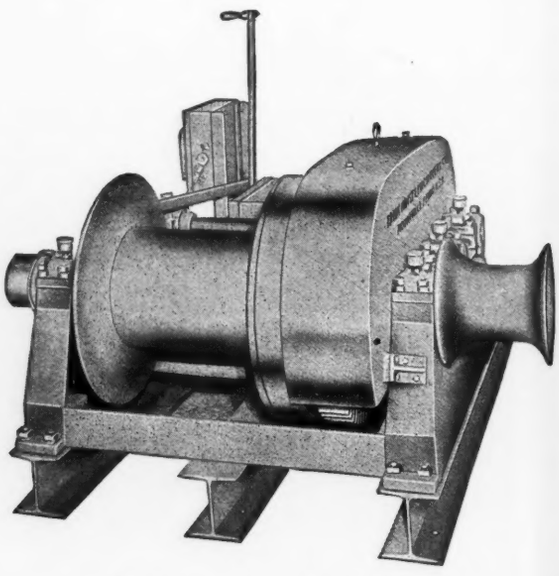
Bins of this type are constructed by assembling the steel sheet-piling in

Close view of the silo-type steel storage-bins.

place on a prepared concrete foundation or an elevated steel platform. Each piece of steel sheet-piling is assembled by raising it high enough to engage the interlock of the adjacent pile and then permitting it to drop vertically into place. For the cylindrical bins a circular steel angle is first set upon the base and the bottoms of the piles are bolted to this angle. The only other bolting required



The portable plant showing vibrating screen and cone crusher.



Combination drum-and-capstan car-puller.

Rectangular bins for crushed-stone storage.

is in connection with the few steel hoops placed around the bin and with another steel angle placed around the top to form a coping and a base for the conveying machinery or roof structure. No riveting is employed in this construction.

The advantages of this construction are simplicity and speed of erection regardless of weather conditions, and without the necessity for special construction equipment. This construction is particularly adapted to temporary installations as the interlocking piling can be dis-assembled readily and the bins reërected at another location. If for any reason the bins are no longer required, a ready market can be found for the piling, which possesses a high salvage value on account of its many other uses in the construction field.

Cylindrical silos of this type have been installed by the Jennings Coal Co. and by the Lehigh Coal & Navigation Co. Rectangular bins for the storage of crushed stone were installed by the Union Paving Co. All these installations are in Philadelphia, Pa.

The Jennings installation consists of a cluster of four cylindrical bins, each 18 ft. 8 in. in diameter and 30 ft. 6 in. high. The capacity of the plant is 1,000 tons.

The Lehigh Coal & Navigation Co. installation consists of two groups of three bins each in line, the groups separated by a smaller bin. All bins have a diameter of 18 ft. 8 in. The large bins are 42 ft. high and the small bin 13 ft. Capacity of plant, 2,000 tons.

The Union Paving Co. installation consists of four open rectangular bins. The sizes of the bins are 64 ft. by 25 ft., 55 ft. by 25 ft., 16 ft. by 25 ft., and 13 ft. by 25 ft. The height is 15 ft.

## New Manganese-Bronze Welding Rod Introduced

A new bronze welding rod, known as "Oxweld No. 25 M. Bronze Patented Welding Rod," has just been introduced by The Linde Air Products Co., New York, N. Y. Because of its special characteristics this improved manganese-bronze rod is unexcelled for use in the rebuilding of wear-resisting surfaces such as piston rings or cylinder walls. Besides producing weld metal with superior wear-resisting qualities, this rod has the added advantage of being non-fuming and exceptionally free-flowing.

It is possible to remelt and reweld welds made with this welding rod with an ease heretofore considered impossible with a bronze welding rod. This rod is particularly effective for use in the sectional building-up of large pieces, where the weld must be made in successive layers, because there is no heavy slag formed over the weld after it has cooled.

One of the outstanding features of the new rod is the hardness of the resulting weld. Welds made with it have consistently shown a hardness of 96 Brinell. This is an important consideration when building-up wearing surfaces such as bushings or other abrasion areas.

The new welding rod can be readily identified because the name, "Oxweld No. 25 M. Bronze Patented" is stamped at intervals of about 12 in. along its length. It is supplied in three sizes: ⅛ in., 3/16 in., and ¼ in.

## Develops New Tank Car to Handle Bulk Cement

An enthusiastic reception has greeted the new Dry-Flo tank car recently developed by the General American Tank Car Corp., Chicago, for transporting bulk cement and similar products by rail. The new carrier is watertight, eliminates two or more handling operations, and savings up to $2 per ton in shipping costs have been reported during the period in which the car has been under test.

Stationary and semi-portable plants for handling cement to and from the new car are to be built by the Link-Belt Co.

Illustrations of the new car and handling plant are now being made and a complete description of the entire system, together with pictures, will appear in the next issue of PIT AND QUARRY.

## Multiple V-Belt Drive Patent Suit Is Settled

The following statements have been issued by the two concerns involved in a patent suit over the rights to sell and manufacture V-belt drives:

"The Allis-Chalmers Manufacturing Co. announces that the suit between it and the Dayton Rubber Manufacturing Co., of Dayton, O., in United States District Court at Cincinnati, O., involving patent infringement of Allis-Chalmers Geist patent No. 1,662,511, pertaining to multiple V-belt drives has been settled out of court. The Dayton Rubber Manufacturing Co. takes a license under the Geist patent and the Allis-Chalmers Manufacturing Co. has the right to operate under short patent No. 1,538,303, if it so desires."—Allis-Chalmers Mfg. Co.

"Notice is being sent out to the trade generally by The Allis-Chalmers Manufacturing Co. of Milwaukee, Wis., and The Dayton Rubber Manufacturing Co. of Dayton, O., that the suit of The Dayton Rubber Manufacturing Co. against the Allis-Chalmers Manufacturing Co., in the United States District Court, in the Sixth Circuit, at Cincinnati, involving patent infringement of Allis-Chalmers' Geist Patent No. 1,662,511 pertaining to multiple V-belt drives has been settled out of court by the contending parties effecting a mutually satisfactory commercial working arrangement, under which Dayton takes a license under the Geist Patent No. 1,662,511 and Allis-Chalmers can operate under the Short Patent No. 1,538,303."—Dayton Rubber Mfg. Co.

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The Buckeye Sand & Gravel Co. of McConnellsville, O., has applied for federal permission to dredge sand and gravel from the Ohio River between Powhatan Point, O., and Parkersburg, W. Va., a distance of 75 miles.

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Eugene Enloe, president of the Idaho Portland Cement Co., of Pocatello, Ida., has been elected president of the Washington Trust Co., one of the leading banking institutions of Spokane, Wash.

# Saving Through Safety

## *Missouri Valley Cement-Mill Operators Gather in Rousing Safety Session*

CONTINUING its plan of an intensive accident-prevention program to carry on throughout 1932, the Portland Cement Assn. conducted another of its successful regional meetings Tuesday, March 15, at Kansas City, Mo. The meeting was held at the Kansas City Athletic Club. A total of 97 representatives of cement plants in Kansas, Nebraska, Iowa and Missouri and guests attended the all-day meeting.

A. K. Frolich, superintendent of the Louisville, Neb., plant of the Ash Grove Lime & Portland Cement Co., was general chairman of the meeting and opened the morning session, which got under way about 10 o'clock.

The session began with a report of the safety record of the participating companies, which was presented by Stanley Owens, safety engineer of the Portland Cement Assn. The feature of the morning session, however, was a symposium on "How We Won the Association Trophy," by M. L. Silcox, chief chemist, Pennsylvania-Dixie Cement Corp., Des Moines, Ia.; C. M. Carman, superintendent, Universal Atlas Cement Co., Independence, Kan.; and D. M. Webb, chief draftsman, Ash Grove Lime & Portland Cement Co., Louisville, Neb. These representatives of plants which won the safety trophy last year gave in their own words the story of how it was accomplished, tracing the plans and methods used by their respective safety committees in reaching the goal of a year's operation without a lost-time accident.

Next on the program was a paper written especially for the meeting by Dr. C. O. Sappington of the National Safety Council, Chicago, on the subject "Recent Developments in the Prevention and Control of Infection," which was read by Dr. Fred Candler of the Bonner Springs, Kan., plant of Lone Star Cement Co., Kansas. Dr. Candler predicated his reading of the address by stating that the total amount of compensation awarded for infectious injuries in New York State alone in one year was $2,978,777. He told of the antiseptic value of the various commercial germicides in treating wounds and injuries sustained about the plant.

"In considering the relative importance of first-aid procedure, many persons fail to realize two facts that can not be overlooked, (1) that there are infections which take place in spite of the best use of good first-aid procedures and (2) that there have been many cases of minor wounds healing without the application of first-aid methods, but one never knows when these occurrences will take place and this is not sufficient reason for avoiding acknowledged first-aid practices. A true application lies in the general condition or relative resistance of the human body; in one case the natural capacity of body for fighting infection was inadequate regardless of preventive measures; in the other it was sufficient despite the absence of first aid." The paper dealt in considerable detail with the treatment of splinter and puncture wounds. In closing, Dr. Candler summed up a number of recommendations for treatment which included the utmost necessity of good surgical supervision in the control and prevention of infections, allowing the doctor or plant nurse to choose the proper antiseptics and urged that plant executives accept the fact that infections can be prevented and controlled when the problem is properly attacked through the use of sufficient consideration, of time, professional advice and money.

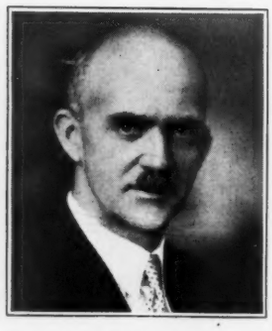
"Eye Protection" was a topic of a short talk by J. G. Stadler, chief chemist of the Iola, Kan., plant, Lehigh Portland Cement Co. Mr. Stadler told in an elementary way of the component parts of the human eye and cited the fact that, while many eye injuries are due to flying chips, etc., which are absolutely preventable by the proper use of goggles, there are many serious injuries and eye ailments suffered by workers due to floating cement dust and splashing slurry.

He factiously referred to the fact that an ordinary stock eye of the artificial type can now be purchased for $10, with a made-to-order eye costing about $25—due, no doubt, to the existing depression!

The luncheon session was under the supervision of E. Struckmann, general superintendent, Lone Star Cement Co., Kansas. F. C. Lynch, director of the Kansas City Safety Council was the luncheon speaker. Mr. Lynch delivered an interesting talk on the topic of the day—safety—citing various statistics which indicate the important advances made since accident-prevention work was started only a few years ago.

C. M. Carman, superintendent of the Independence, Kan., plant of the Universal-Atlas Cement Co., presided at the afternoon session, which opened with a paper by W. D. Ryan of the United States Bureau of Mines. This was followed by a discussion of "Fires, Their Cost and Prevention," by C. P. Mitchell, superintendent, Humboldt, Kan., plant, Monarch Cement Co.

C. A. SWIGGETT
Supt., Lehigh Portland Cement Co., Iola, Kan.



A. K. FROLICH
Supt., Ash Grove Lime & Portland Cement Co., Louisville, Neb.

C. M. CARMAN
Supt., Universal Atlas Cement Co., Independence, Kan.

"Fires around the cement mills," declared Mr. Mitchell, "could often be prevented if more use was made of our own product, cement, in the construction of our buildings. Store rooms should be built absolutely fireproof with doors, windows and shelving of concrete, steel and glass. See that the plant fire department is properly equipped, make a daily inspection of all plant equipment and appurtenances where there might be a possible fire hazard. Educate the employees to the danger of life and property of fire and your loss from this source will approach the vanishing point."

Raymond L. Atkisson, storekeeper at the Bonner Springs plant at the Lone Star company, read an interesting and rather allegorical paper entitled "Man and Machine." Mr. Atkisson made a comparison of the industrial machine and the human machine and brought out the fact that the human machine gets far less care, service and proper repair than does the man-made machine. He declared that cheerful thinking develops the proper mental attitude and urged that everyone make it a point to create within himself the right mental attitude toward his work as a mea s of preventing accidents.

The meeting was concluded with the annual safety banquet, at which C. A. Swiggett of the Lehigh Portland Cement Co. at Iola, Kan., acted as toastmaster. Baxter D. MacLain was

the principal speaker at the dinner. Mr. MacLain is a prominent Kansas City attorney and cited some of the legal aspects of accident prevention as it affects the plant management as well as the employees. Entertainment included several vocal numbers by the Lehigh Male Quartette and the Red Ringer Band from the Sugar Creek plant of the Missouri Portland Cement Co.

The following companies and their representatives attended:

Ash Grove Lime & Portland Cement Co., Chanute, Kan.—Guy O. Gardner, superintendent.

Ash Grove Lime & Portland Cement Co., Kansas City, Mo.—R. M. Cox, assistant auditor; L. Kittle, general auditor; Andrew Lundteigen, vice-president; W. P. Sabin, vice-president and treasurer; R. M. Slater, advertising manager; A. B. Sunderland, secretary and assistant treasurer.

Ash Grove Lime & Portland Cement Co., Louisville, Neb.—A. K. Frolich, superintendent; David W. Webb, chief draftsman.

Lehigh Portland Cement Co., Kansas City, Mo.—F. T. Brown, district sales manager; L. L. Drake, chief clerk.

Lehigh Portland Cement Co., Iola, Kan.—Lloyd Carter, P. B. Fegely; C. E. Kietzman, chief electrician; R. E. McDonald, chief engineer; J. O. Myers, foreman; C. E. Russell, chief clerk; J. G. Stadler, chief chemist, C. A. Swiggett, superintendent; W. A. Woodruff.

Lone Star Cement Co., Bonner Springs, Kan.—J. Alexander, warehouse foreman; R. L. Atkisson, storekeeper; Claude A. Benson; Dr. Fred Candler; George G. Casper, purchasing agent; George Davenport; J. W. Ditto; J. A. Fairchild, chief chemist; L. H. Fitzpatrick, machinist; J. H. Griffith, assistant chemist; J. A. Jones, engineer; C. W. Keirns; N. C. Keirns; W. B. Mills; Raymond Moore, repairman; C. E. Smith; J. W. Wasson, quarry foreman; L. J. Wheeler, superintendent; R. W. White; D. R. Willis; Lucille Woodman.

Lone Star Cement Co., Kansas City, Mo.—J. A. Lehaney, vice-president.

Missouri Portland Cement Co., Independence, Mo.—E. E. Bowen; J. S. Craig; C. K. Fry, Jr.; Clark Galvin; M. W. Gould; W. H. Harle, shop foreman; H. B. Irving, safety inspector; F. W. Lytle, quarry superintendent; R. C. Miller; Paul Smith; John P. Stewart, chief electrician; R. F. Turner; Frank Twyman; S. C. Withee; W. E. Zimmerman.

Missouri Portland Cement Co., Kansas City, Mo.—V. K. Newcomer, superintendent.

Missouri Portland Cement Co., St. Louis, Mo.—D. B. Coleman, safety director; R. Uhlig, general superintendent.

Missouri Portland Cement Co., Sugar Creek, Mo.—C. E. McCormick; Herman Ralston; Orin Streeter; Raymond Wiseman.

Monarch Cement Co., Humboldt, Kan.—E. P. Hoover, traffic manager; C. P. Mitchell, superintendent; W. C. Shaffer, master mechanic; W. J. Sinclair; Walter H. Wulf, chief engineer.

Nebraska Cement Co., Superior, Neb.—D. C. Coulson, superintendent.

Pennsylvania-Dixie Cement Corp., Des Moines, Ia.—J. R. Guidi, master mechanic; D. J. Riordan, traffic manager; M. L. Silcox, chief chemist.

Universal Atlas Cement Co., Hannibal, Mo.—C. F. Colley, safety supervisor; R. E. Hoffman, superintendent.

Universal Atlas Cement Co., Independence, Kan.—C. M. Carman, superintendent; Fred J. Davis, personnel director.

Universal Atlas Cement Co., Kansas City, Mo.—H. B. Bolton; H. J. Dorman; S. H. MacArthur, sales manager.

Universal Atlas Cement Co., Watonga, Okla.—J. Palmer Camm, superintendent.

## Special Alloy Reclaims Ball-Mill Liner Plates

Ball mills are widely used in the nonmetallic-minerals industries. Many types of balls have been used in recent years since a change was made from the flint balls imported from Norway and Sweden. Chilled cast iron has been employed extensively, and at present the trend seems to be toward the use of alloy-steel balls containing chromium.

The combination of impact and abrasion results in rapid wear of the liner plates. This has long been a serious problem since the cost of manganese-steel liner plates is relatively high when their short life is considered.

A typical ball mill, 6 ft. in diameter and 9 ft. in length, contains 36 manganese-steel plates, each measuring 10 in. by 4 in. by 3 in. in thickness. It is general practice to remove these plates when they are worn down to 1½ in. in thickness, because frequently at that stage some sections have been reduced in spots to a thickness of ½ in. The average life of such liners in one instance was found to be about 3 months.

In order to increase the period of service of these plates at this operation the possibility of economically hard-surfacing the liners was investigated. Since the plant had available several tons of scrap drill steel, it was decided to use some of this steel as a partial filler in building up the worn surfaces. As the time required to dismantle the mill was at least 3 days, the rebuilding was carried on in place. Furthermore, since the plates were left in position, warping during reclamation was reduced to a minimum.

Using the electric-arc process, the drill steel was tacked in place on the worn faces of the liner, and the surface was then built up evenly with Hascrome, a self-hardening, chromium-manganese-iron alloy welding rod. Depending upon the amount of drill steel used, each plate required from 30 to 100 lb. of the hard-facing alloy.

In the first test, about half the liner plates were reclaimed and the mill put back into operation. Since the mill is still running, final figures on the total service life and comparative costs are not available. However, an examination of the liner at the end of the first month, after 1,500 tons of material had passed through, satisfied officials that the application would be successful and economical. The process is adaptable to practically any type of ball mill in which excessive wear of the liner plates is encountered.

## Book Reviews

GENERAL ENGINEERING HANDBOOK. *Charles Edward O'Rourke, Editor-in-Chief. 936 pp. McGraw-Hill Book Co., Inc., New York and London. Price $4.00.*

Associated with Mr. O'Rourke in the preparation of this newest of engineering handbooks were twenty-nine of the foremost authorities and they have accomplished the task of compiling a great amount of fundamental data in a compact pocket book of less than a thousand pages. The volume is divided into 31 sections. Six of these sections contain material of importance to all engineers; eleven belong primarily in the field of civil engineering; nine in mechanical engineering; and five in electrical engineering. A bibliography of the more important works dealing with the subject are included at the end of each section.

CHEMISTRY OF ENGINEERING MATERIALS. *By Robert B. Leighou. McGraw-Hill Book Co., New York and London. 684 pp.*

The third edition of a standard work on chemical engineering. In preparing and revising the material, the aim has been to avoid complexity of treatment insofar as possible without becoming superficial. Some of the newer theories on the conversion of coal into oil by hydrogenation have been introduced. A section on high-early-strength cements has been added. In fact, through improvement in subject matter or in method of presentation, most of the chapters have been modified to an important degree. More than 100 pages are devoted to nonmetallic minerals and their products.

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The Grayson Limestone Products Co., Leitchfield, Ky., of which Sherrill McClure is secretary and treasurer, is about to establish a quarry and plant equipped for the production of crushed stone for highway and agricultural purposes.

# Light-Sensitive Tube for Accurately Controlling Concrete Mixtures

ONE of the relatively recent uses of the photoëlectric tube is in the proportioning of concrete aggregates, where it is adapted to the control of scales and weighing machines. It is highly sensitive and entirely eliminates the necessity of using mechanical contacts which, by reason of their resistance to motion, would be bound to affect the scale accuracy seriously.

Such equipment makes the measurement of materials going into the batch almost entirely automatic and thus eliminates a large part of the errors due to the human element. The feed is cut off automatically and the discretion of the operator is not involved, so that all batches are uniform.

The Toledo Scale Co. markets a device consisting of a General Electric photoëlectric tube mounted inside the indicating-mechanism housing of a dial scale and located immediately behind a narrow slot in the dial. On the outside of the housing is attached an electric lamp and reflector. The slot is between the light-sensitive tube and the electric lamp or light source. When any object is brought between the electric lamp and the slot in front of the photoëlectric tube, a change in current is produced in the tube and this is utilized to actuate an electrical relay. The light "interceptor" with a paddle-like tip, is attached to the regular indicator so that, when the dial or weight indicator is at the zero desired weight position, the interceptor is over the dial slot to cut off the light from the electric lamp to prevent its reaching the photoëlectric tube. When the dial indicator is in any other position than zero, the slot is uncovered and the light rays from the electric lamp are transmitted through the slot to the light-sensitive tube inside the mechanism housing.

The electric relay may be connected to, and made to operate gates, valves, conveyors, belts, bells, lights, and other similar electrical devices. It is capable of breaking an electric current of 15 amp. at 110 v., or 220 v., a-c., and can be so arranged that the contact may be either closed or opened when the desired weight is reached.

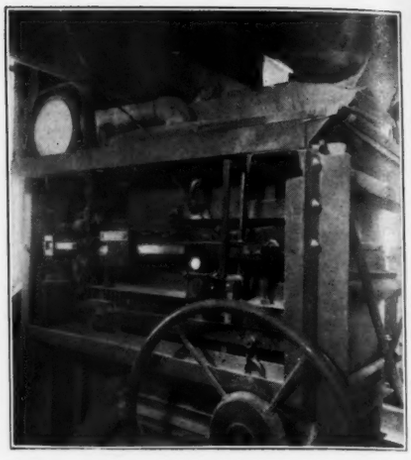
Operation is as follows: Each material going into a batch of concrete requires one beam on the front of the Toledo compensation auto gauge and that beam is used exclusively for the material to which it is assigned. If six different materials are to be weighed out for a batch of concrete, then the gauge must be equipped with six beams. The dial capacity is equal to, or slightly in excess of, the capacity of any one beam used on the device.

If it is desirable to weigh out 1,000 lb. of one of the materials going into the batch, the poise of the beam assigned to that material is moved out to the 1,000-lb. graduation on the beam. When the poise is moved out for the material to be weighed, the indicator revolves in a counter-clockwise direction and indicates an amount equal to the value of the poise setting. The operator starts the feed of the material by means of a starting button and, as the material accumulates in the weight hopper, the indicator hand moves in a clockwise direction until it reaches zero, at which position the interceptor affects the photoëlectric tube which in turn energizes the relay, shutting off the flow of material.

The operation described is repeated as many times as necessary for the number of materials to be used in the batch, and each time the indicator returns to zero and shuts off the feed as required. There are several advantages, one of the most important being that it is not necessary to make the dial capacity equal to the sum of the capacities of the beams. It need only be as great as the weight of the heaviest ingredients. Inasmuch as each graduation is equivalent to one 1,000th of the dial capacity, this method of utilizing a lower capacity dial makes it possible to weigh cement and water on the same scale with aggregates and yet remain well within the tolerances for these materials. This means that the electric cut-off will operate with five or six times the accuracy which would be possible otherwise. Another advantage is that the cut-off always takes place with the indicator in the zero position, thereby eliminating all necessity for mathematical calculation in order to determine whether the proper quantities are being fed or whether the device is operating as it should.

The scale may also be equipped with a graphic recording attachment and may be used for determination of specific gravity, per cent. of surface moisture, sieve analysis, absorption of bone-dry aggregates and for weighing and compensating for moisture in materials going into batches of concrete.

The moisture compensating attachment enables contractors to produce concrete of any desired strength. After the moisture determination tests have been made, for each aggregate, the poise is moved out on the beam representing the aggregate to be weighed. Assuming in this case that 2,400 lb. of sand in the dry state are to be used, one of the poises which has been assigned to the sand should be moved out to 2,400 lb. Since this material contains 8½ per cent. of moisture, sufficient small percentage weights should be selected from the holder to make up 8½ per cent. These weights are then suspended from the poise. The addition of the percentage weights will cause the scale indicator to travel still further in a counter-clockwise direction so that it will indicate a total of 2,604 lb. The 204 lb. represents the amount of moisture compensated to introduce exactly 2,400 lb. of surface dry sand to the mix. The sand is now fed into the weight hopper and the scale indicator turns to a clockwise direction until it reaches zero, at which point the feed will be cut off automatically by the photoëlectric tube. After all ingredients have been weighed in this manner, the proper amount of water is easily ascertained and added by weight.



Cement scale in N. Ryan Co. plant in Brooklyn. The scale-beam is shown in raised position exposing the light source.

This arrangement has recently been used in several large projects. Among these are the new Koon Dam at Cumberland, Md.; The Cranford Co., Brooklyn; and The Arundel-Brooks Concrete Co., Baltimore.

An application to a Fairbanks scale of the beam type has been made by N. Ryan Co., Inc., of Brooklyn, manufacturers of ready-mixed concrete. With the assistance of the General Electric Co., a scale was equipped with a photoëlectric relay for this purpose.

The scale beam is set for the weight desired by means of a poise. A light source is set directly back of the beam and the photoëlectric relay is 6 ft. in front of it. Cement is fed into the hopper and, when the proper weight is reached, the beam rises, exposing the light source and energizing the photoëlectric relay. This causes the opening of a control circuit to the cement feed motor and automatically shuts off the supply.

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At a special meeting of the board of directors of the Keystone Driller Co. of Beaver Falls, Pa., held recently, the following officers were elected: President, L. M. Johnston of Pittsburgh, formerly vice-president of A. M. Byers Co.; Vice-president, E. C. Rebeske, formerly treasurer of the Union Drawn Steel Co.; Secretary, R. R. Downie; Treasurer, C. T. Smith.

The Keystone Driller Co. manufactures excavating and mineral drilling equipment. Mr. Johnston reports that the outlook for new business going into 1932 indicates that the year will show a considerable increase in volume.

# Eighteen tons per hour from a No. 19 Crusher—100% through three-eighth inch opening using less than fifteen horsepower

THE following is the result of a test on a No. 19 Kennedy Ball Bearing Gearless Crusher.

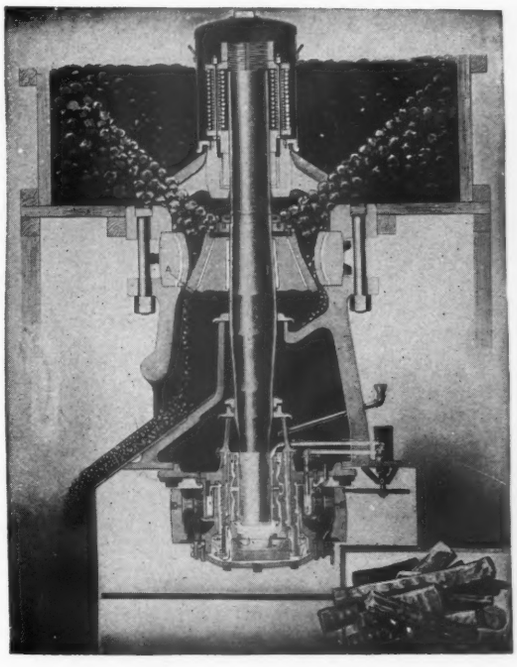
Exceedingly hard glacial gravel, 1½" and plus ⅝", was crushed for sand for concrete purposes, and less than fifteen horsepower was used.

The same crusher can be opened up and 1½" stone can be produced at a rate of from 30 to 50 tons per hour.

With the opening set to ⅛" on the closed side the following results were obtained:

| | |
|---|---|
| Minus ⅜" | 100 % |
| Plus 3 mesh | 21½% |
| Minus 3—Plus 4 | 17 % |
| Minus 4—Plus 14 | 36½% |
| Minus 14—Plus 48 | 15 % |
| Minus 48—Plus 100 | 4 % |
| Minus 100 | 5½% |

*This was crushed at the rate of 18 tons per hour.*



*Built in various sizes with receiving openings from 1¾" to 14". Produces sizes from ⅛" to 3", with capacities up to 620 tons per hour on the larger sizes.*

The Kennedy Ball Bearing Gearless Gyratory Crusher is guaranteed to do more crushing, size for size, of any given material, with less power consumption, than any crusher ever built. 90% Of the power input to motor is applied direct to breaking the rock between head and concaves. The head and shaft of the type "S" crusher is suspended on springs to permit tramp steel to pass through. The ball-and-socket eccentric is self-aligning. This crusher may be operated by a synchronous motor, built in the pulley of the crusher, or by belt from standard motor. This crusher takes one-half the power required for a geared crusher, and saves 80% in the cost of maintenance.

We manufacture a complete line of primary jaw and gyratory crushers, ball mills, rod mills, screening, elevating, and conveying equipment, etc. Complete information describing any or all of this machinery will be sent on request. *Send for latest information on our vibrating screen.*

## KENNEDY-VAN SAUN MFG. and ENG. CORP.

Two Park Avenue, New York, N. Y.

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# Classified Buyer's Guide

## A Directory of PIT AND QUARRY Advertisers Arranged According to Product

*Although every effort is made to insure accuracy and completeness in these listings, the publisher cannot accept responsibility for errors or omissions. Any mistakes discovered will gladly be rectified, if brought to the attention of the Advertisers' Service Department.*

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Allis-Chalmers Mfg. Co.
Kennedy-Van Saun Mfg. and Eng. Corp.
McLanahan and Stone Corp.
Rogers Iron Works Co.

# *"It Handles More Yards per Dollar"--*

**--that's what hundreds of users say about the**

# SAUERMAN SCRAPER

You can tackle tough overburden, hard-packed gravel banks, river deposits or beds of boulders with a "Crescent" scraper bucket with full assurance that the bucket will move a maximum yardage of materials with a minimum application of power. This great digging ability is due to the unique plow-share design and curved plate construction which distinguishes the "Crescent" from all other scraper buckets.

Operators prefer a "Crescent" bucket to any other; it handles easily and will stand a tremendous amount of grief without requiring repairs.

For illustrations and descriptions, write for Catalog No. 16.

WHETHER your work is excavating sand and gravel, stripping overburden or handling materials to and from storage piles, you can depend upon a Sauerman "Crescent" Drag Scraper in every case to handle a maximum tonnage in return for each dollar of operating expense.

A "Crescent" scraper bucket in operation seems to accomplish so much with such little effort. It starts to gather its load the instant it is pulled forward, filling to capacity within a few feet of travel; then it ceases to dig and simply "rides" its load across the surface. The operation is rapid and continuous, the bucket making as much as 40 round trips per hour when hauling materials 300 ft. Handling capacities range from 100 to 5,000 tons per day; operating spans can be extended any distance up to 1,000 ft.

**SAUERMAN BROS., Inc., 434 S. Clinton St., CHICAGO**

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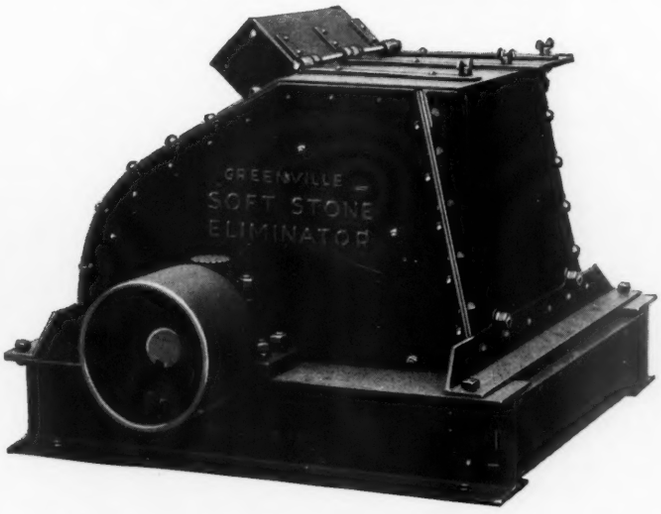
## THE GREENVILLE SOFT STONE ELIMINATOR

FOR REMOVING SHALE, SAND STONE AND DELETERIOUS SUBSTANCES FROM GRAVEL




FOR ELIMINATING FOREIGN MATTER WHICH RESISTS ANY ORDINARY SCRUBBING ACTION

The GREENVILLE SOFT STONE ELIMINATOR has more than twice the efficiency and capacity, requires less horse-power, occupies less floor space and height, and costs less money than any other machine built for the purpose.

F. M. WELCH ENGINEERING SERVICE, Inc., GREENVILLE, OHIO

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National Wire Cloth Co.

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**DO your present belts slip, stretch or shrink? Are atmospheric changes, moisture, and sharp, gritty materials cutting short their life and service? Then try "Veelos,"—the powerful, compact, durable belting material that is least affected by the rough requirements of quarry operations.**

**Test this "different" kind of a belt under actual service conditions in *your* quarries. Then you will understand why we have faith in being able to demonstrate that "Veelos" Genuine Balata is the strongest, toughest, longest-lived belting material known.**

**Your test can be made on a proposition that protects you on its cost if "Veelos" does not out-work, out-wear, and out-last any belt that it replaces.**

**Write today for full details of Users' Special Test-Price Proposition.**

# MANHEIM MFG. AND BELTING CO.

**MANHEIM, PENNA.**

# BRADLEY

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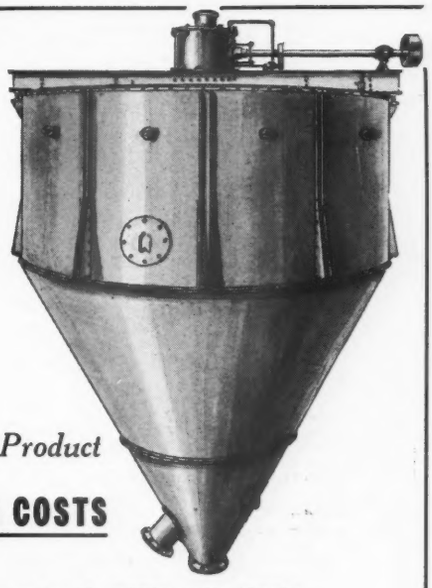
Offer the Cement, Limestone, Gypsum and Their Allied Industries an Installation for Every Requirement



Insuring:

*Maximum Capacities,*
*Any Degree of Fineness,*
*Absolute Uniformity of Product*

**AT MINIMUM OPERATING COSTS**

**CAPACITIES: 1 to 60 TONS PER HOUR**
**FINENESSES: 20 to 350 MESH**

*Let our engineers help solve your pulverizing and separating problems.*

# BRADLEY PULVERIZER CO.

Boston London

Works: ALLENTOWN, PA.

European Mfgr.—Etablissements Fernand Poitte, Paris

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Universal Vibrating Screen Co.

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Allis-Chalmers Mfg. Co.

**Tramways (Aerial)**
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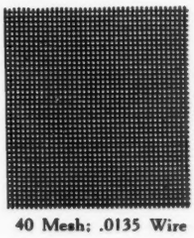

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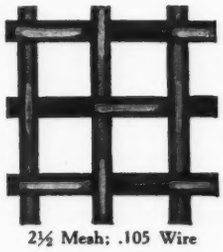

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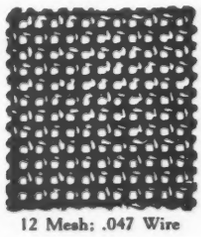

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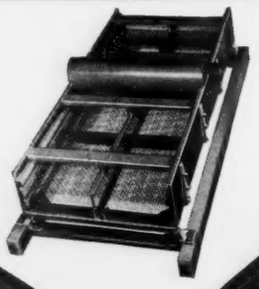

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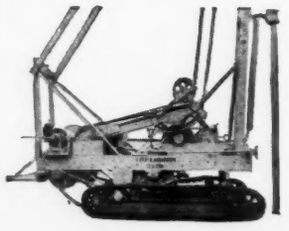

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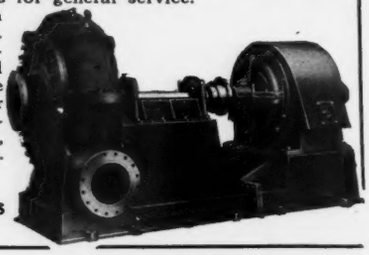

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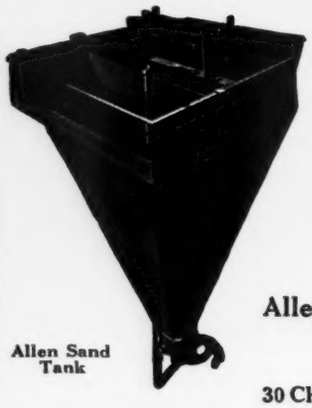

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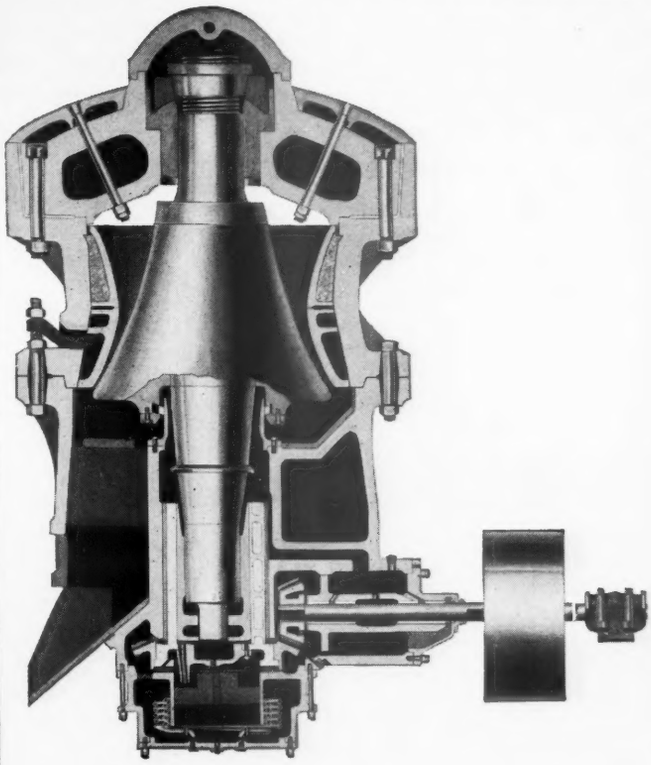

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WITH PATENTED BELL HEAD AND CONCAVES

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*"***When you presented this type of crusher to me for consideration, I was skeptical as to its performance*** Upon your assurance***we placed the order with you and I am glad to state that it is one of the finest installations we have ever made.***Its performance has been a decided revelation to other operators.***"*

THERE ARE MANY REASONS

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In connection with certain types of non-choking crushers, we call the attention of the public to our patent 1,837,102 issued December 15, 1931, relating to crushers of this type. We intend to enforce our rights under said patent against all manufacturers and users of stone crushers containing the features covered by said patent and to prosecute all infringers of said patent.

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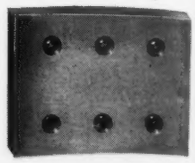

wear more than twice as long as ordinary composition blocks—and pay for themselves in renewal labor saving alone.

Palmer Molded Brake Blocks are made in any size or shape for any make or model of equipment. They last twice as long as ordinary wood or composition blocks.

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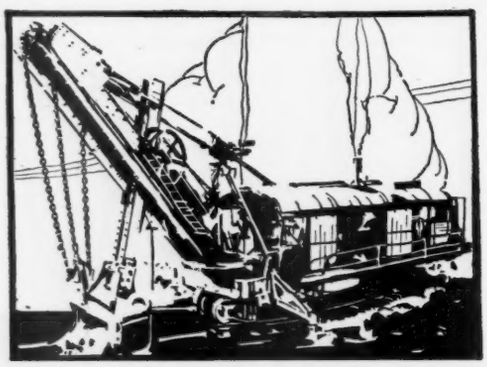

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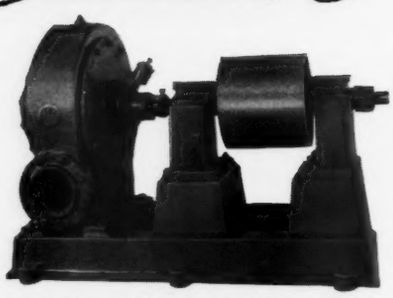
Sand and Gravel Pump



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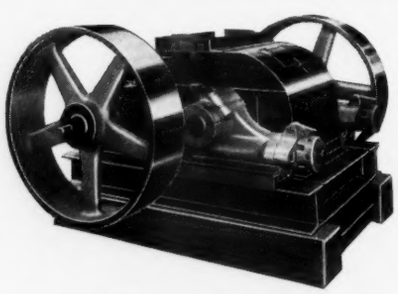

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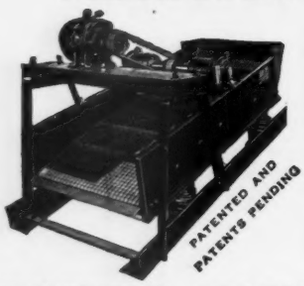
## VIBRATING SCREEN

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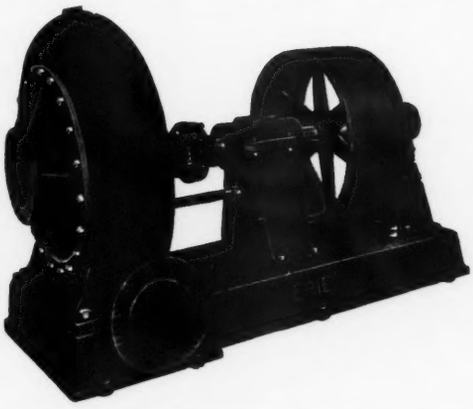

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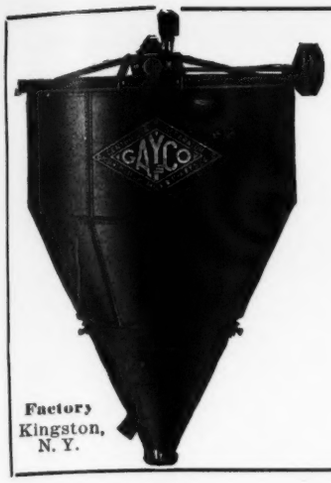


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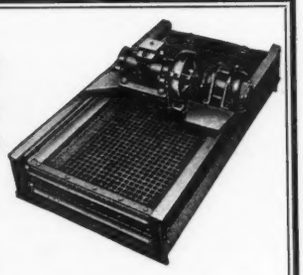

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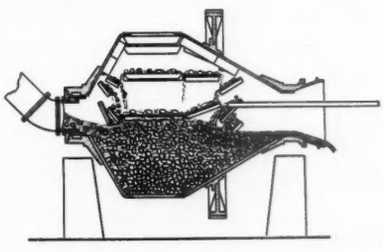

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Machine good as new.

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Universal Truckcrane, A-1, with Christie Crawlers. $2500. Others $800 and up.
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Thew 55 Shovel and Crane, new '30, used 8 mos. 1 yd. Strictly A-1. Price $5000.
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28 to 525 ft. free air per minute.
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1-A. 12 years' experience Highway construction and sand and gravel. Can design and install own pits. Ready-Mix concrete. Have operated Central Mixing plants.

4. Stone Quarry Supt. or Supt. asst. 12 yrs. experience in commercial stone and railroad ballasting; operating and repairing all kinds and makes of equipment. Wide experience in drilling and blasting. A-1 references.

5. Chief engineer cement plant; 10 years' experience; desires connection with engineering or manufacturing firm, either in the office or in the field.

9. Quarry foreman, 6 years' experience.

10. Superintendent; 10 years' experience; lime and stone.

11. Superintendent crushed stone; 25 years' experience.

12. 10 years' experience in production of crushed gravel and sand; design engineer and builder; general superintendent; has had some sales experience. Experience covers the entire field.

14. Thoroughly experienced superintendent who has also in the past been assistant superintendent and foreman of granite and lime quarries; at present not employed.

15. Experienced superintendent or manager; graduate engineer; 12 years' experience in sand and gravel production and plant design.

16. Superintendent, 30 yrs. experience, mine, mill and quarry and large shovel operations, thorough knowledge of various systems of underground and open pit mining. Development work from grass roots to mill construction and operation, copper, iron, zinc and non-metallics, 4 yrs. special work in asbestos, mica and kaolin, good organizer and good production and safety record but not a college graduate. South, Southwest or Tropics preferred.

18. Superintendent of stone crushing and sand and gravel plant with considerable experience in operation of dredges, draglines, electric and steam shovels, all kinds of crushing, conveying, screening equipment. Can furnish excellent references, good record and details of past experience.

19. Electric Shovel Operator with considerable experience. Also power-house and general electrician, maintenance, welding, repairing gasoline truck motors, crushers, screens and various kinds of equipment.

20. Crushed stone superintendent since 1903; prefer West or Southwest territory; thoroughly experienced in construction and operation of plants, know how to get best results from the quarry end.

21. Cement plant superintendent or heavy limestone quarry; 20 years' experience in construction and operating plants.

24. Superintendent, stone quarry or slag plant 16 years office and operating experience.

25. Dragline, Crane and Shovel Operator, 9 years' experience in steam and 3 years on electric shovel (Marion), desires position as operator. Can do own repairing. Permanent connection desired. Married. References furnished. Will go anywhere, but a location near good schools preferred.

26. Operator with 5 years' experience on Link-Belt and Koehring cranes. Also 7 years' experience in sand and gravel pit. Available now. Go anywhere.

27. Laboratory work, 3 years' experience as Asst. Chemist doing control and analytical work. College graduate, B. S. degree.

28. 12 years' experience as cement burner and night foreman and watchman.

29. 14 years' practical quarry experience, office, sales, management, superintendent, reconstruction, etc. Open for new connection with progressive company, preferably sand and gravel concern.

30. Crushing plant and quarry Superintendent. Experience includes erecting, rebuilding and repairing machinery. Successful in organizing labor for economy. References furnished.

31. Superintendent crushing plant. 10 yrs. limestone and rock asphalt quarry operation experience. Can furnish best of references. Will go anywhere.

32. An overhead traveling bridge crane man. Experienced. Can give good references. Willing to go anywhere.

33. Cement mill general foreman, 12 years' experience, familiar with all requirements in construction and operation. Available immediately. Can locate anywhere. Single.

34. Capable man. 53 years old. Married, experienced in quarry and crushing plant, timekeeping, payroll and plant office work, seeks position as assistant superintendent, general foreman or plant office work, where experience and loyalty will be appreciated. Will not be interested in investing money at the present time in any position. Have you an opening?

35. Superintendent of crushing and quarrying plant. 14 yrs.' experience in cement business, including changing plants from dry to wet process. Can furnish references.

36. Cement Mill Chemist with 4 years of cement mill work on both wet and dry processes, and 8 years of wide experience in organic analytical work covering all problems incidental to the manufacture of cement.

37. Office man experienced in general office work, correspondence, sales and operations, desires similar position with large lime, cement or gypsum concern. Nine years with Southern lime firm. Age 27, single. Willing to locate anywhere. Available immediately.

38. Situation wanted as Manager or Superintendent of a progressive crushed stone plant where ability and experience would be appreciated. 38 yrs. of age. Scotch birth. American citizen. 15 yrs. experience in quarrying and crushing plants. Now available. Best of references. Location in eastern or middle states preferred.

39. Ten years experience as Burner man; reliable. Age 37. Desires position where ability and skill will be appreciated by advancement. Available immediately.

40. Man with 10 years practical experience in civil engineering and highway construction of all kinds as well as bridges, grading, culverts, etc. Understands map making and topographical survey. Included with this is 4 years tracing and drawing. 3 years with army engineers in Panama. Salary no object.

42. General superintendent or manager; experienced graduate engineer.

43. Sales Engineer desires making change, preferably New England territory. 20 yrs. experience with a reputable concern designing, estimating and selling material handling equipment in all phases. Broad acquaintance among executives and buyers.

44. Want position as carpenter or millwright, capable of taking charge of gang. Steady work preferred with cement company.

45. Operator with ten years' experience on Bucyrus-Erie Steam and P. and H. Gas Shovels in grading, gravel pit and stone quarry work. Can furnish references.

46. Gravel plant supt. or manager. 10 yrs. supt. of large railroad and trucking plants. Experienced in erection and care of gravel plant equipment. Can furnish best of references. Services available at once. Will go anywhere.

47. Graduate Engineer. 25 yrs'. experience as designing, constructing and operating Engineer, as well as Supt. of stone crushing and gravel washing plants, also heavy rock blasting.

48. Graduate Engineer. Wide experience as mining, consulting and sales Engineer, in charge of all outside operations, construction and maintenance. A-1 references.

49. 15 yrs'. experience in erecting and operation, crushing, grinding, washing, drying, screening and separation plants. Know value of low production costs. Good references.

50. Gravel Plant Supt. 7 yrs'. experience erecting and operating gravel plant equipment for large manufacturer. 2 yrs. in charge of mining operations in Brazil. Best of references.

51. Supt. of crushed stone and gravel plants. 12 yrs. experience. Familiar with maintenance and repair work on all types of equipment. Can handle men. First class references.

52. Past experience with Crushed Stone and Sand and Gravel plants; in sales, can figure with contractors, scales, cost, timekeeping, bookkeeping, general all-around man.

## Can You Use THESE MEN ?

*Employment Dept.*
PIT AND QUARRY
538 So. Clark St. Chicago, Ill.

53. Quarry superintendent with years of experience in all operations, such as stripping, drilling, blasting, shovel loading, crushing, sinking, also repairing of all quarry equipment and familiar with all phases of washing crushed stone. Now open for proposition. Excellent reference.

54. Engineer experienced in Mechanical, Structural, Electrical, Plant Design and Layout, Estimating, Field work, Maintenance and Millwork desires position. Will locate anywhere.

55. Superintendent of crushed stone products plant and quarry. Twenty years experience in this and foreign countries in charge of operations. Familiar with modern up-to-date methods and profitable application of same.

56. Master Mechanic, thoroughly trained in the upkeep of crushers, steam shovels, gas and diesel equipment, etc. Reference and complete information on request.

57. General operating Superintendent desires position with progressive Lime or Cement Company. 20 years' experience as operating superintendent and master mechanic. Familiar with Limestone quarries and burning of limestone and Portland Cement with natural gas or Producer gas. Master Mechanic of large Lime and Cement plants. Installed reasonable system which did not bar progress of operation. References A-1.

58. Position as Superintendent by graduate Mining Engineer. 35 years old with wide operating experience in large open pit mines and crushed stone plants up to 10,000 tons. Thoroughly experienced in Quarry layout, development, heavy blasting, shovel loading, transportation and mill design and operation, electric or steam power, and with latest type high speed reduction crushers, screen analysis of a sampling and grading of specification stone.

59. 13 years' experience in general office work, including correspondence, sales and operations. Well acquainted with freight rate structures on crushed stone, sand and gravel and cement. Desire connection with any concern where ability and experience would be appreciated.

60. Slackline Cableway operator. 5 years' experience. Can keep cableway operating at full capacity. Can do repair work. Had experience raising and lowering mask or tower. Can do all necessary rigging around cableway.

61. Wants position as foreman of a rock, sand and gravel, or oil-mix plant, preferably the latter. Several years' experience as foreman of oil-mix and hot stuff proportioning plant. Can furnish best of references from previous employers and contracting engineers. Will go anywhere but prefer the west or middle west.

62. Position wanted as quarry superintendent. Prefer southwest or west coast.

63. Stone Quarry Supt. or Supt. asst. 14 yrs. experience in commercial stone and railroad ballasting; operating and repairing all kinds and makes of equipment. Wide experience in drilling and blasting. A-1 references.

64. Position wanted by operator with 15 years' experience on cranes, shovels, draglines, sand pumps, dredges, etc. 35 years of age, can furnish A-1 references. Will go anywhere.

65. Graduate mechanical and structural engineer with wide experience on cement and stone plants. Permanent or temporary employment.

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